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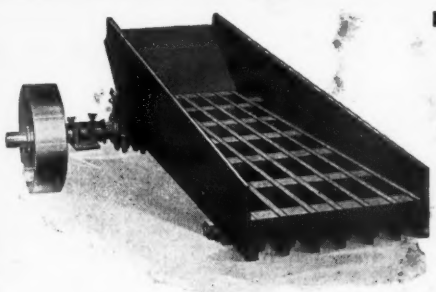

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June, 1922

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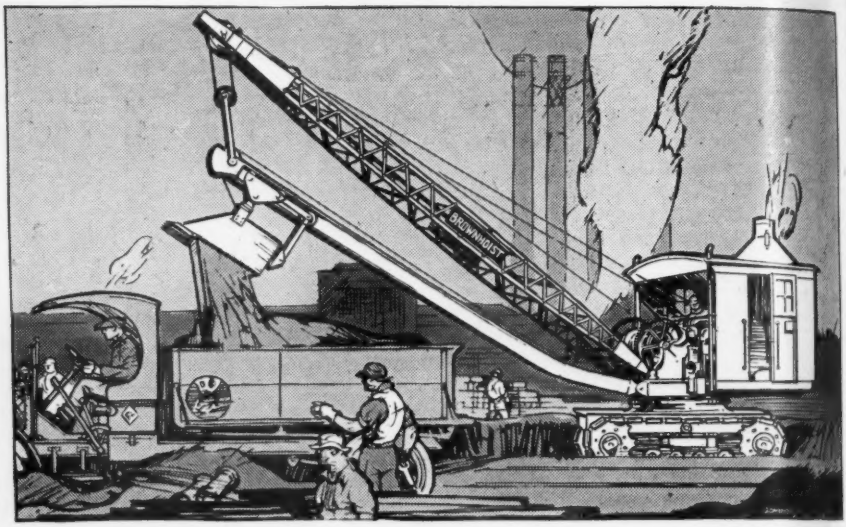

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MATERIAL HANDLING MACHINERY

Pit and Quarry

Member Audit Bureau of Circulations
A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime

VOL. 6 CHICAGO, ILL. JUNE, 1922 NO. 9

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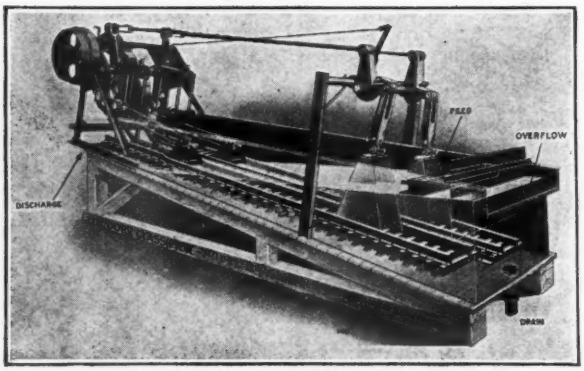

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Pit and Quarry

Vol. 6 Chicago, Ill., June, 1922 No. 9

Lime Plant Without Precedent

Notable Combination of Most Recent Methods in Production of This Material

BY J. J. FITZGERALD

MANY of the structural features of the American Lime and Stone Company's new plant at Bellefonte, Pennsylvania, have no precedent in the lime industry. The plan of operation differs in important particulars from anything that has been tried up to this time and the progress toward completion of this notable enterprise has attracted widespread attention. Many lime and quarry men have visited the workings and all have come away greatly impressed with what has been accomplished and what is in prospect.

For years the American Lime and Stone Company has been operating in the central part of Pennsylvania, gradually growing in importance with the acquisition of new plants until it is at present the largest producer in a section of country where there is a big demand for lime and limestone products. "Away back when" a man named Andrew Carnegie was running a little steel plant in the Pittsburgh district and finding it hard enough to pay his bills for fluxing stone. Mr. A. G. Morris, president of the American Lime and Stone Company, was producing that stone and, presumably, picking Andrew Carnegie as a winner. Mr. Morris, whose activities at the advanced age of eighty-seven would shame many a man forty years younger, still heads the business, and is associated in its management with Mr. J. King McLanahan, Jr., Hollidaysburg, Pa. Mr. McLanahan is also president of the McLanahan-Stone Machine Company of Hollidaysburg.

The American Lime and Stone Company is at present operating thirty-five lime burning plants and two hydrate plants, stretching along the same rock formation for some 9 miles. It was this extensive spread of their interests that first caused the officials of the company to lay plans for the plant now nearing completion at Bellefonte. Many other factors influenced the decision, but this chiefly gave rise to it.

All along the formation from which the limestone is taken there is inclined stratification that adds materially to the difficulties of operating. The determination of the officers to sidestep these difficulties by a new method gave rise one of the best features of the plants, its new slope mine shown in the sketch on page 67.

Following the suggestion of Mr. Joel H. Watkins, Mining Geologist, Madisonville, Va., and Mr. Charles A. Morris, the efficient general superintendent, the company had the quarry floor cleaned off to a certain point and employed Mr. E. J. Longyear, a Minneapolis engineer and expert at this work, to sink a shaft at 52° to the horizontal, 390 feet deep through

Side View of House on Quarry Trestle

a stratum parallel to that containing the stone desired. In this stratum of good stone and above the bottom of the shaft were made 4 stopes with 30 feet faces in three benches. These stopes are reached by crosscuts from the shaft, as shown. The shaft is 8x24 feet, running through a stratum of limestone 8 feet thick so that advantage could be taken of the stopes in drilling and blasting. The inclination of the measure changed gradually from 52 degrees at the surface to 63 degrees at the bottom. The shaft is concreted at the collar for about 20 feet.

A 250-ton storage pocket connects the lower crosscut with the shaft and this pocket is connected with the upper crosscuts by a raise with bypasses to the crosscut. The stone in the pocket will be fed by compressed-air-actuated revolving drums into measuring pockets which will discharge into 5-ton skips.

At first dump cars at the various faces will be loaded by hand, but later steam shovels will be loaded part by part and assembled below ground. Electric motors will take the cars from the shovels to the raise.

There are in the shaft three trackways, two for stone skips of 5 tons capacity each and one for the man car, which will be used for transporting the workers. The skips are so arranged that one is drawn up as the other descends, thus placing upon the hoist merely the duty of raising the 5 tons of stone. When the work is finished and operations begin, skips will discharge into the head frame bin at the rate of one each 60 seconds, giving thus an output of 300 tons per hour, 3,000 tons to the 10 hour day. The man car will be operated by a separate hoist.

When the skip of stone reaches a point about midway up the head frame track, the head end is automatically tipped forward and the stone discharged into a steel bin of 500 tons capacity. This action is made possible by equipping the skip with narrow inside flanged wheels at the front and broad outside flanged wheels at the rear and making for the wheels two separate sets of rails, each one half as wide as the rail in the shaft. One of these sets of rails continues in the original direction, while the other set is curved to the horizontal, terminating over the stone bin. The

cable is secured to the skip by a bail, which is hinged to work freely toward the rear part of the body, and thus permit the cable to run in one direction only. When the front wheels run on the inclined track the skip is automatically tilted and its contents discharged.

The head frame used at the top of the shaft was designed and erected by the Traylor Engineering Company of Allentown, Pa. Steel was supplied by the Lehigh Structural Steel Company of Allentown. It is a structure that was built to comply with all the mining regulations of the State and at the same time permit rapid and efficient operation.

Another View of Crusher House, Showing McLanahan Crusher

Located at the bottom of the steel bin, into which the skip discharges are specially designed pneumatically operated bin gates of the clamshell type which will load dump cars run underneath. The pneumatic controls for these gates are supplied with air by a 20x12½x14-inch Ingersoll-Rand compressor, which also supplies the air lines to the shaft and cross cuts. Air will be utilized below ground for the operation of Ingersoll-Rand air hammers. Ventilation will be secured by blowers which will keep the air changing continually and rid it of powder fumes after blasting.

When cars of stone are loaded below the head frame bin they will drop down the track, which has a slight grade, to a trestle running up to and beyond the stone hopper from which the crushers are fed. This trestle, which, after leaving the quarry floor on the side of a hill, is about 35 feet high, is set on concrete piers reaching nearly 30 feet above the ground and resting on substantial foundations. The section of the trestle between the first and second piers spans Buffalo Run, a stream that at some times assumes quite respectable proportions. About 175 feet out is located the large hopper, served from tracks at both sides. Two tail tracks of about 100 feet each extend from the hopper to the far end of the trestle.

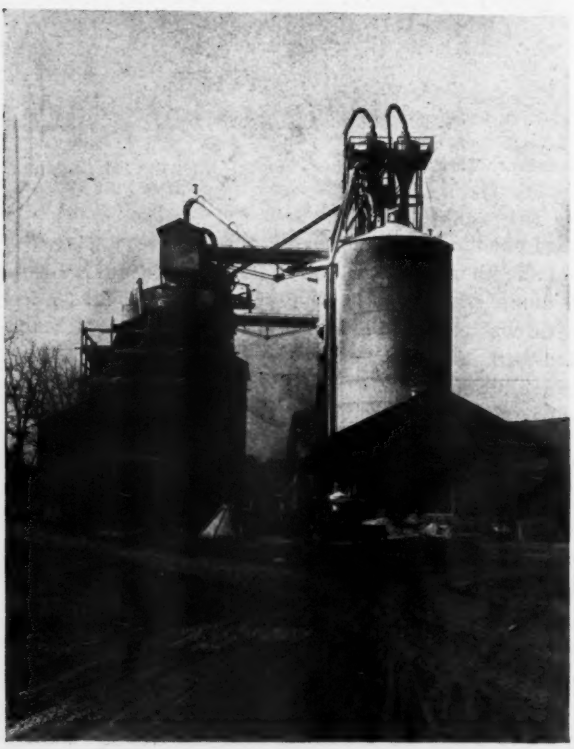
The plant proper was designed by the Schaffer Engineering & Equipment Company of Pittsburgh, Pa. Their work started with the trestle running from the quarry, at which point the

mill operations as such may be said to begin.

The large steel hopper, 16 feet square and 8 feet deep, feeds a McLanahan 36x60-inch single-roll crusher located directly below it. This crusher reduces the stone to 4-inch size and spouts it to two No. 7½ Gates crushers, manufactured by the Allis-Chalmers Company. These discharge through a chute to a Manhattan Rubber Company belt conveyor 36-inches wide and 256 feet long operating at 17 degrees. This conveyor is 8 ply in the center and 10 ply along the edges. It operates in a steel reinforced concrete belt gallery and is driven by an electric motor at the head pulley.

This conveyor passes the stone to a rotary screen 26 feet long and 6 feet in diameter, furnished by the McLanahan-Stone Machine Company. Fines from the first two sections of the rotary screen, all of which will be less than ¾-inch, will drop into a hopper which will feed a shaking screen through a belt conveyor, or by-pass the belt conveyor to the storage bins for car loading, or go direct from the hopper to the storage bins for the rotary kiln. Under each of the hoppers below the various other sections of the rotary screen are revolving spouts, two of which may be turned to fill three sections of storage bins for car loading. All other chutes can be turned to fill two of these sections. Oversize drops to the last hopper from where it may be sent to either of two sections, or spouted to a special oversize bin. With this arrangement it will be possible to get any desired mixture of stone sizes.

When it is desired to have finer stone than ¾-inch, it can be taken from the hopper under the first two sections of the rotary screen by a 14-inch belt conveyor onto a Schaffer shaking screen, the first section of which will give stone less than ¼-inch, second section of which will give stone less than ½-inch, the larger sizes passing over the end. There is a separate bin for each of these sizes.



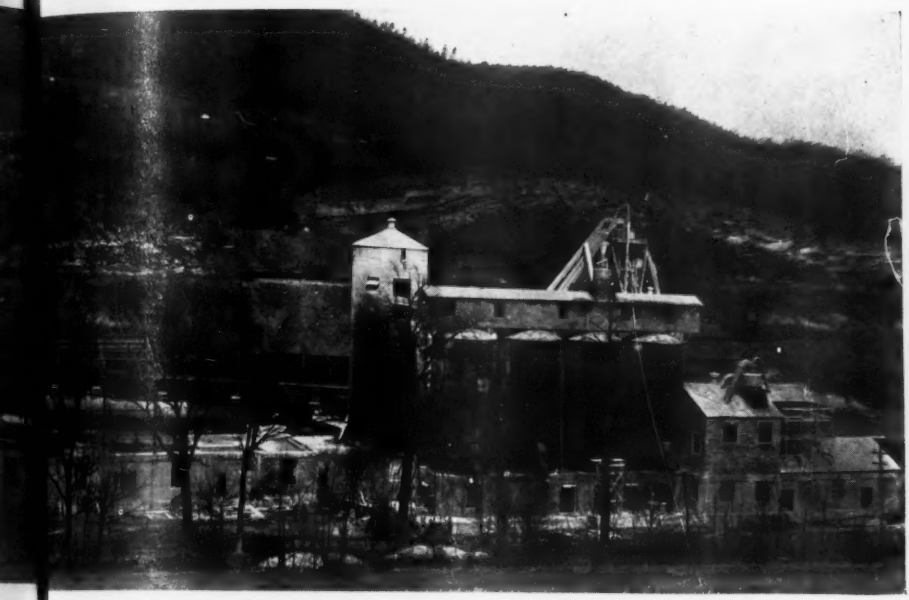
An End View of the New Hydrate Plant

The storage bin sections for car loading are equipped at the bottom with gates, through which the stone may be dropped onto railroad cars underneath and sold as commercial crushed stone. Each of these sections also has a chute at the bottom from which stone may be taken and passed on to a pan conveyor,

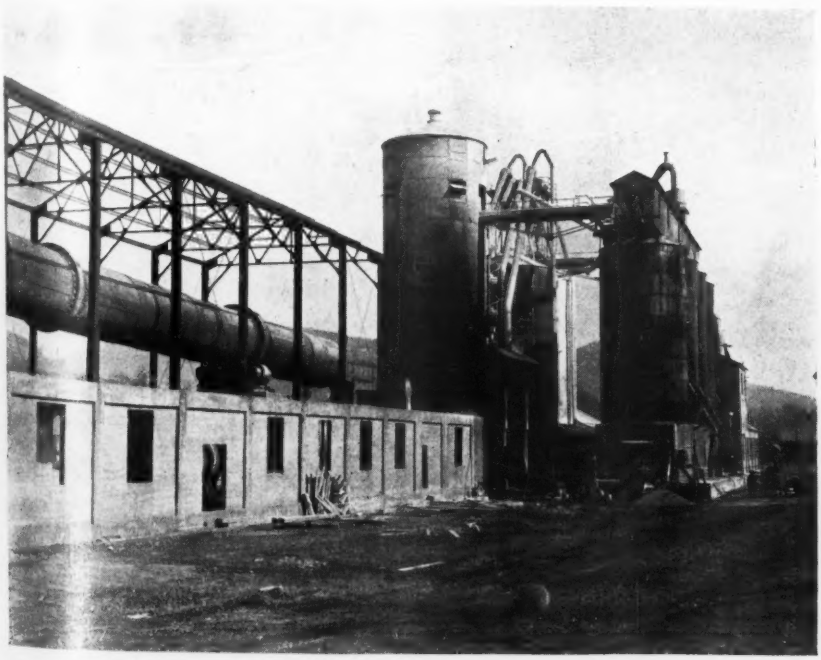
General View of Plant, Showing Trestle from Quarry and Screen House with its Conveyor in Foreground

View of Plant from Side with Screen House, Rotary Kiln Plant and H in For

Crusher House on Quarry Trestle and Conveying Elevator to Screen House



in Foreground. Old Quaarry Face in Background



Hydrate Plant from Side of Rotary Kiln Plant

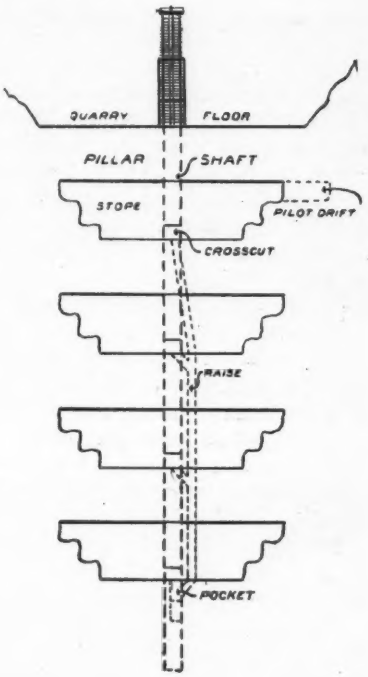
Steel Head Frame at Mine. Note Stratification in background

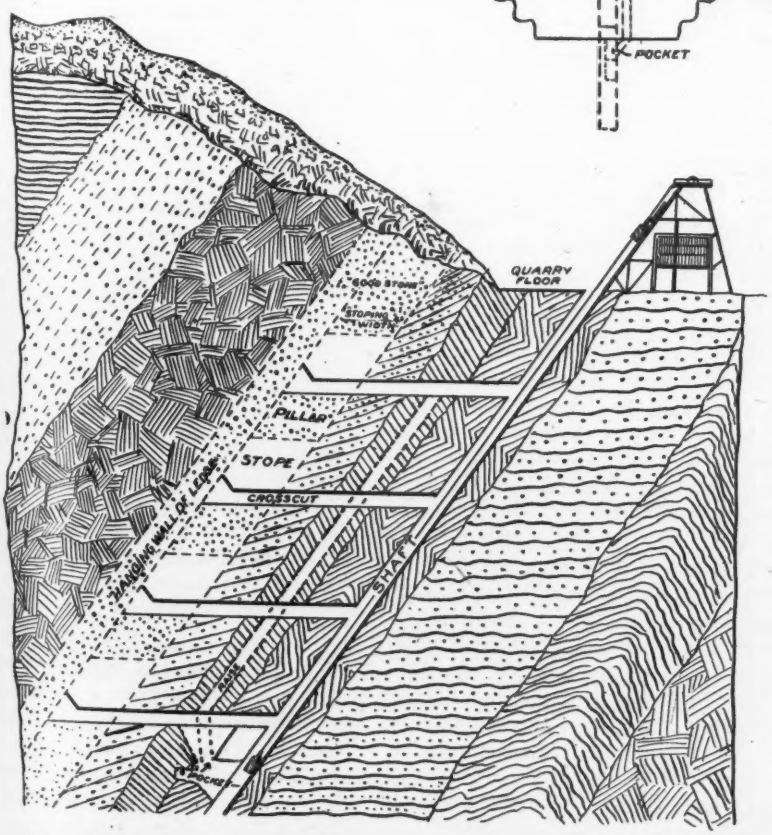
Dump Cars—One of the crosscuts

which will discharge either into another pan conveyor to be taken to the rotary kiln, or on to an elevator which will discharge upon a shuttle conveyor about 90 feet long, running over eight concrete storage bin sections and arranged to discharge in the particular bin where it is desired to deposit the stone.

The fine stone taken from the bin sections under the shaking screen can also be loaded into box cars with a flexible loading spout, which is supplied with material by operating a flop gate. This flexible spout is connected to the same chutes which take the fine stone to the pan conveyor under these bins.

Each of the eight stone storage bin sections at the end of the rotary kiln





Above, Section Through Stopes. Below, Section Through Shaft and Crosscuts.

plant opposite the screening house has a capacity of 535 tons and will be equipped at the bottom with three bin gates to insure practically exhausting the bin of stone, if necessary, when any particular size is required. When the piles of crushed stone in the various bins have assumed their natural slope over areas not covered by the gates very little stone will be left.

Underneath all these sections of bins a traveling hopper, operating on a track built into the frame of a pan conveyor which runs the entire length of a reclaiming tunnel, can be moved to any desired opening. When the gate is opened the stone drops to the pan conveyor through the traveling hopper.

The pan conveyor deposits the stone at a 21x42 single-roll crusher made by the McLanahan-Stone Machine Co.

The stone drops by gravity to an elevator which discharges on to a Schaffer shaking screen. This passes the materials, viz., No. 1 stone and No. 2 stone, to their respective bins, under each of which is located a Schaffer poidometer discharging into a two-way spout with a fly gate to discharge either to a Worthington tube mill 22 feet long and 6 feet in diameter, or on to the rotary kiln pan conveyor.

The stone can be made to by-pass the tube mill by being chuted from the bin to the pan conveyor below the tube mill. It is also possible to by-pass the single-roll crusher and send direct to the tube mill any stone of sufficient fineness for milling without preliminary grinding. Or the roll crusher and the tube mill can both be eliminated from the process when there is available stone that is fine enough for burning in the rotary kiln without previous treatment.

One notable feature of the plant as a whole is its flexibility of operation in such matters as the by-passing of materials around any piece of machinery through which it does not need to be run, and the accomplishment of this in small spaces and without the use of a lot of additional equipment. Everything has been designed to save power and space.

Running parallel with the tunnel for the pan conveyor is a hot air duct in which the waste heat from the rotary kiln will be utilized during cold weather to keep the stone warm and dry enough to run freely into the pan conveyor. A No. 9 American L. H. Sirocco fan will be used to draw the heat from the bottom of the kiln stack and pass it through the duct the full length of the bins. The duct is lined with brick over which is the covering of concrete of which the bins are made.

After the stone has passed through the crusher and the tube mill, or has by-passed either or both, it will be dropped to a 14-inch pan conveyor running below the tube mill and passed to a vertical elevator about 60 feet in height which will feed the big rotary kiln.

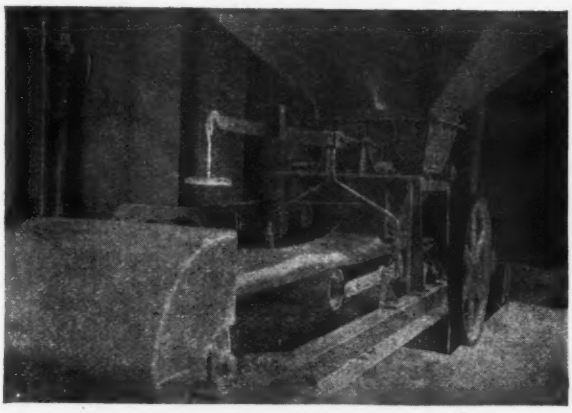
This kiln, 175 feet long and 9 feet in diameter, is now in place and ready for action after the firing, charging, and driving equipment have been added. It will be fired by coal by a No. 3 Schaffer furnace fed by a coal bunker of 220 tons capacity located above. Pennsylvania hammer mill equipment will be used for reducing the coal to sufficient fineness for employment in the Schaffer calcining process.

The kiln is a product of the Reeves Bros. Company plant at Alliance, Ohio. In driving it a Reeves variable speed transmission made by the Reeves Pulley Co., of Columbus, Ind., will be used.

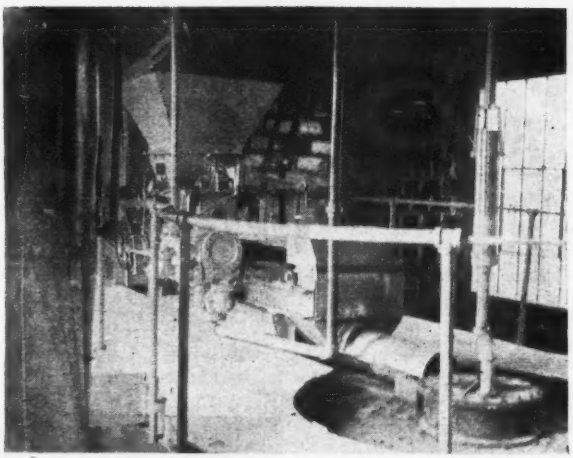
The elevating and conveying equipment used throughout the plant was furnished principally by the Webster Manufacturing Co., of Chicago, who also supplied a number of transmission devices for various parts of the process.

After the limestone has been burned to the proper degree in the rotary kiln it will be passed to a rotary cooler 60 feet long and 6 feet in diameter located below the kiln and arranged for convenient transfer of the hot material. After the material has gone through the cooler it will drop to a 14-inch pan conveyor running back underneath the cooler and conveying and elevating the lime to an S5 Pennsylvania hammer mill. Or, if reduction at this point by the hammer mill is not necessary, the lime may be bypassed and delivered to one of the two ground lime bins of 320 tons capacity each.

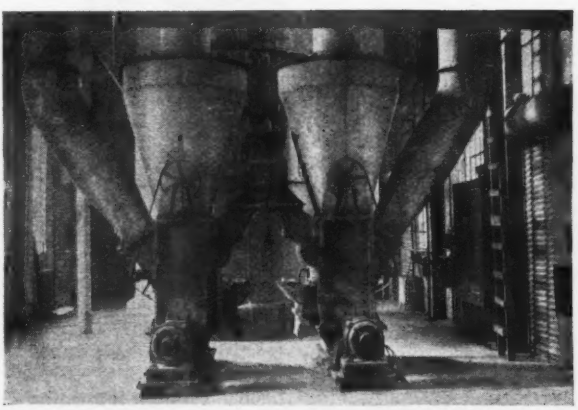
Pending completion of the parts of the process so far described, the company is operating its new hydrate plant, which was the first part to be finished, with lump lime brought in railroad cars from one or another of its shaft kiln plants. To keep the plant supplied with lime from this source, they have installed a hopper in the track alongside the plant, at the bottom of which is a McLanahan-Stone Machine Co.'s roll crusher. Lime is shoveled into this hopper from the cars, reduced to convenient size for the Pennsylvania hammer mill described



View of the Schaffer Poidometer



Poidometer and Top of Hydrator



Raymond Pulverizers for Handling Hydrated Lime

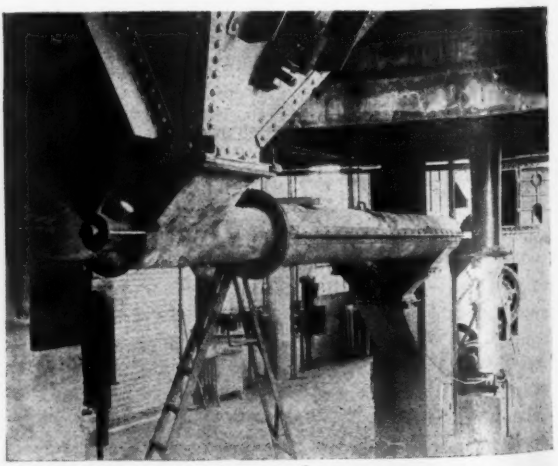
above and passed by an 18-inch pan conveyor to an elevator and dropped back to the machine. At this point the operation of the hydrate plant begins.

Provision has been made in building the rotary kiln plant for a conveyor to run from the tube mill underground to a ground stone tank along one of the loading tracks, thus permitting sale and convenient loading of this material.

An arrangement has also been made to pass lump lime from the rotary cooler direct to lump lime storage tanks located along the loading track. Lime may be loaded direct into cars in bulk from these tanks, or barreled and stored on platforms from which convenient shipments may be made. At the side of the lump lime storage tanks ample space will be provided for an empty barrel storage.

At this point it is interesting to know that the equipment of this plant is so complete as to include a department for the manufacture of steel containers for shipping lime. This shop, about 30x60 feet in size, contains equipment for turning out about 600 barrels per day, employing the labor of seven men. The equipment for making the barrels is furnished by the G. H. Stoll Co., Inc., of Buffalo, N. Y., and produces a container 18 inches in diameter and 26 inches high, and of sufficient size to carry 185 pounds of lime. Barrels are made from 27 gauge sheet steel, corrugated to provide greater strength and with lapped seams which make the container airtight and watertight. Bottoms, tops and covers are of the same material, the cover having the company's name stamped on it. After the barrel is assembled and filled ,the cover is sealed on with a hand sealing device.

The first step in the hydrate plant is the reduction of the lime by the Pennsylvania hammer mill. The product of this machine is picked up by an elevator with 7x12-inch buckets and passed to a Schaffer automatic hopper which feeds the Schaffer poidometer. This machine correctly portions out the lime and water in the exact quantities and passes them both to the Schaffer hydrator. The automatic control on the Schaffer poidometer keeps the poidometer supplied with just the amount of material needed for continuous operation and desirable results. Located just ahead of the poidometer proper and governed by the evenness of the quicklime and water supplies, it keeps forwarding just the required quantities of quicklime from the ground lime bin and acts as a safety check in the event of curtailment of the quicklime or water supply. If for any reason, the flow of quicklime is stopped, the sensitive automatic control is affected and at once shuts off the water, obviating the possibility of any damage to the lime that has already entered the hydrator.



Screw Conveyor Feeding Elevator to Ground Quicklime Bin

In this hydrator the lime is distributed in even layers and water so sprayed as to come in contact with every particle of lime at the proper time. This eliminates mixing of a large mass to evenly distribute water. The mixing action is most thorough and complete. In this is utilized a furrowing action working against centrifugal force and the same action in conjunction with centrifugal force alternately. This action can be accelerated, retarded, or otherwise controlled to suit conditions and the nature of the quicklime. The several discs are so constructed as to permit the mass further advanced in the process of hydration to pass to its next stage and retain the heavy unfinished particles for further action. This makes an even finished product with the minimum of rejection.

After thorough hydration, the material is passed by a 12-inch screw conveyor to two Raymond mills which pulverize it, eliminate all dust and dirt, and elevate the finished product by blowers to the two finished hydrate storage tanks of 440 tons capacity each. From these tanks are supplied four Bates valve bag packers. In addition to these tanks there are four others, each with a capacity of 250 tons of hydrate or 400 tons of ground lime.

The hydrate plant is a marvel of order and cleanliness. All machines are driven by electric motors and the absence of shafting and belting is one of the things that strike a visitor most forcibly.

In this part of the plant as in the others partly finished, all speed reductions in cases where belting would otherwise be employed are made by speed reducers furnished by the Cleveland Worm Gear Co. of Cleveland, Ohio. In this plant there are 18 of these Cleveland worm gear drives, used on elevators, belt conveyors, rotary coolers, fans, the rotary kiln, and feeder loaders. It is interesting to note that these devices contain identically the same form of worm gearing that the manufacturers have heretofore produced exclusively for the automobile truck axle industry, and are mounted throughout on ball bearings exactly similar to automobiles.

General Electric motors, controllers, oil switches and safety panel boards are used throughout the plant, as are D & W fuse boxes.

When the rotary kiln plant is finished the company will build a plant next to it containing 23 shaft kilns with a total daily capacity of 570 tons. In connection with this there will be a screening and loading plant for lump lime and a double unit hydrate plant with a daily capacity of 250 tons. There will also be two ground lime storage tanks of 1,500 tons capacity each, a bag storage and four finished hydrate storage tanks at 1,250 tons each.

Isaac Nickirk, an employe of the Indiana Quarries Company at Bedford, Ind., lost his life recently in one of the most peculiar accidents that ever occurred in the stone district. He was foreman of the steam shovel crew of the Hoosier quarry at Oolitic and while he and another man were scraping the mud from the bottom of the large shovel, the pivot bottom suddenly closed, imprisoning his neck between the bottom and one of the stationary sides. Employes had to pry the side loose to extricate the victim. The inquest showed that his neck had been broken.

R. B. Ladoo, mineral technologist of the Bureau of Mines, has spent some weeks visiting feldspar mines and quarries in the Western states. Mr. Ladoo has been gathering data intended to make available to all producers information as to improved methods of quarrying and preparing feldspar for market, with special regard of economy of production and

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The Phillips Sand & Gravel Co., Seattle, Wash., has been incorporated with a capital of $25,000. S. A. Phillips and Lloyd N. Savage.

Program of Annual Convention

WEDNESDAY, JUNE 14

Assembly, roll call, and opening remarks by President Warner and representatives of different sections of the country.

Lime burning in rotary kilns.—Irving Warner, Plants Manager, Charles Warner Co., Wilmington, Del.

Forum—Lime Kiln Efficiency: Question sheet and three-minute talks from floor.

Symposium: Lime for Chemical Industries—What are the problems of the Chemical users of lime?

I. Alkali Industry.—R. C. Snowden, Hooker Electro Chemical Co., Niagara Falls, N. Y.

II. Glass Industry.—R. P. Shiveley, Monongah Glass Co., Fairmount, W. Va. Consultant glass chemist and fellow of Mellon Institute.

III. Soda and Sulphate Paper Pulp Industry.—G. K. Spence, New York and Pennsylvania Paper Co., Johnsonburg, Pa.

IV. Soap Industry.

Appointment of Convention Committee.

Complimentary Luncheon.

Address of Welcome: Hon. Newton D. Baker, former Secretary of War, President of Cleveland Chamber of Commerce.

Symposium continued:

V. Water Softening.—S. C. Hadden, Editor, Municipal and County Engineering, Indianapolis, Ind.

VI. Textile Industry.—Elton R. Darling, Textile Specialist and Professor Chemistry in James Milliken University, Decatur, Ill.

VII. Sulphite Paper Pulp.—P. A. Paulson, Consulting Engineer, Paper Industry, Appleton, Wis.

Observations on the lime industry in Europe.—John Kling, President, Kelley Island Lime & Transport Co., Cleveland, Ohio, and Colonel C. W. S. Cobb, President, Glencoe Lime & Cement Co., St. Louis, Mo.

Mechanical handling of lime, illustrated.—H. D. Pratt, The Link Belt Co., Philadelphia, Pa.

Forum—General plant problems: Question sheet and three-minute talks from floor.

A new idea in lime barrels.—T. E. McNamara, Eagle Rock, Va.

What the Bureau of Mines is doing on quarry problems.—Oliver W. Bowles, Engineer, Bureau of Mines.

THURSDAY, JUNE 15

Symposium: Lime in Construction.

I. At the Bureau of Standards.—W. E. Emley, In Charge of Lime Investigations, U. S. Bureau of Standards.

II. Lime in Concrete at University of Pennsylvania.—Prof. H. C. Berry, Professor of Structural Materials, University of Pennsylvania.

III. Forum: Question Sheet and three-minute talks from floor.

Lime in Crop Protection.—Prof. W. C. O'Kane, N. H. Agricultural College and Chairman of Crop Protection Institute of National Research Council.

Forum—Lime in Agriculture: Question sheet and three-minute talks from floor.

Complimentary Luncheon.

Luncheon talks.

How to Handle the Day's Work.—E. Elmo Martin, Cleveland, Ohio.

Photograph.

Afternoon—Clam bake and general good time on the lake shore. In charge of Ohio members.

FRIDAY, JUNE 16

Bearing of the work of the Chemical Department on the large use of lime in the Chemical field.—Dr. M. E. Holmes, Manager of Chemical Department.

What I have found out about lime (with demonstration).—F. C. Mathers, Professor of Inorganic Chemistry, University of Indiana.

Forum—Lime in Chemical Uses: Question Sheet and three-minute talks from floor.

The value of research to industrial associations. — E. R. Weidlein, Director of Research, Mellon Institute, Pittsburgh, Pa.

The Lime Association—National and Regional: The industry's biggest sales organization. — President Warner.

Forum: Putting over lime. Publicity ammunition. Educational pamphlets. Personal work. Regional and National opportunities. Question sheet and three-minute talks from floor.

Some new angles on the use of Lime in Agriculture.—J. A. Slipher, Manager, Agricultural Department.

The high points in the Construction Department program of lime promotion.—W. A. Freret, Manager, Construction Department.

Complimentary luncheon.

Outlook on the Business Conditions.—George A. Coulton, Vice-president of the Union Trust Co.

Business Session:

Secretary's Report and Financial Statements.—E. O. Fippin.

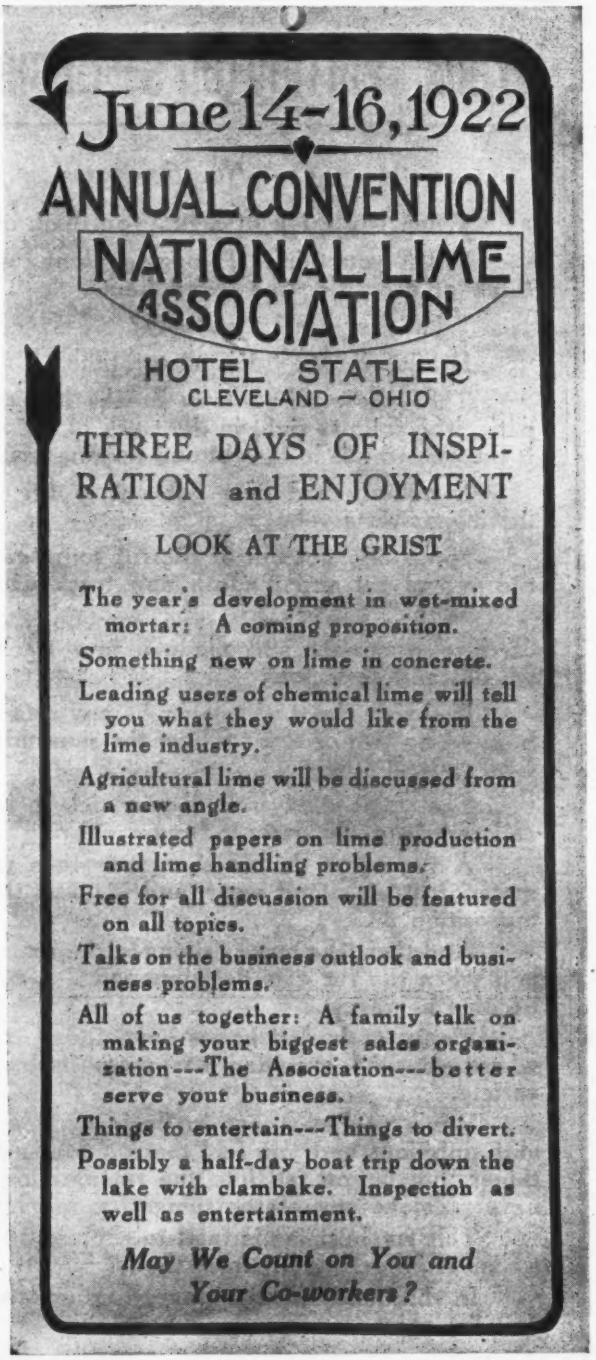
Action on Amendments to By-laws.

Budget for 1922-23.

Election of officers and reports on selection of directors.

New business.

Meeting of new board of directors.


June 14-16, 1922
ANNUAL CONVENTION
NATIONAL LIME ASSOCIATION
HOTEL STATLER
CLEVELAND — OHIO
THREE DAYS OF INSPIRATION and ENJOYMENT
LOOK AT THE GRIST
The year's development in wet-mixed mortar: A coming proposition.
Something new on lime in concrete.
Leading users of chemical lime will tell you what they would like from the lime industry.
Agricultural lime will be discussed from a new angle.
Illustrated papers on lime production and lime handling problems.
Free for all discussion will be featured on all topics.
Talks on the business outlook and business problems.
All of us together: A family talk on making your biggest sales organization---The Association---better serve your business.
Things to entertain---Things to divert.
Possibly a half-day boat trip down the lake with clambake. Inspection as well as entertainment.
May We Count on You and Your Co-workers?

Attractive Mailing Card Advertisers Convention

Frank Farrington's Business Talks

No. 6—Ruts!

When you think of a rut, you think of jogging along.

When you think of jogging along, you certainly don't think of exceeding the speed limit.

What makes a rut anyway?

Driving in one track all the time.

The fellow who never breaks away from the routine path, who follows right in the track of the man ahead of him, is the one who is in the rut and helping make a rut for others.

If nobody had ever got out of the rut, we would be driving ox-carts yet.

Somebody got out of the rut some generations ago, left the ox-cart rut and made a new track with carriage wheels.

Then, a few decades ago, somebody else got out of the carriage wheel rut and made a new track with automobile wheels, and so it goes.

Probably there will never be any ruts made by airplanes because no two of them follow the same identical path.

Of course you want to play it safe.

The rut is pretty safe if you stick to it, but it is wearing and the deeper it gets, the more wearing it becomes.

A rut wears the sides of your tires where there is less material to withstand wear, and it wears the sides from your disposition.

And then, the more driving in the rut, the deeper the rut, and when the rut gets deep enough it is more than likely to become a grave.

Plenty of buried hopes have found their graves in ruts where youthful ambition has worn itself away for lack of variety.

When you start out in business, you have high hopes and ambitions and you feel that you are going to accomplish things, but if you fall into the rut and jog along there, you never achieve any of the things for which you have hoped.

This rut business is fatal to success, though it may keep a man from getting off from the track.

In business as elsewhere, nothing ventured, nothing (much) gained.

(All rights reserved)

Simple and Economical Handling

For simplicity of operation and low cost per yard of material handled, the Essex Fells Co. of Essex Fells, N. J. have apparently solved the problem with the use of two Haiss path-digging type wagon loaders for taking the sand from their bank, screening it and loading it into trucks.

In 1920 they installed a Haiss path-digging wheel equipped machine and with this machine they handled and screened approximately 200 yards per day.

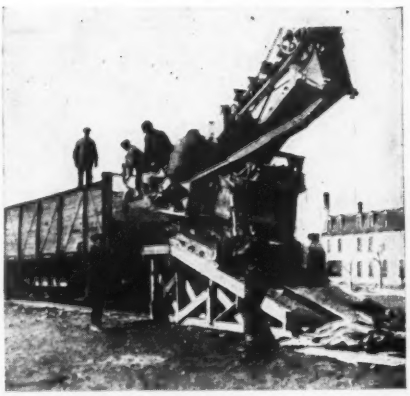
This loader was the beginning of their sand and gravel business; and on account of the increasing demand for their material, they installed in 1921 a Haiss creeper-equipped path-digging wagon loader operated by a four-cylinder gasoline engine. This loader was a heavier and more powerful machine than a wheel equipped loader, but on account of the large caterpillar traction, it was not necessary for them to plank the ground. One operator could easily load 250 yards per day at a cost of 9 cents per yard.

Their method of screening the sand consists of using a plain screen and two chutes. After the material is discharged from the buckets onto the screen the finer particles fall through to the second chute where it is discharged into the trucks. The larger material that will not pass through the screen flows to the edge where it is deflected at a right angle by a coal chute which allows the material to fall over the side of the truck. In this manner five yards of screened material is loaded in approximately eight minutes.

Moving Gravel

Here is a novel method used recently in South Dakota to move gravel for road construction.

At the pit the car ends were left open and each car was loaded by weight with 50 tons of gravel which occupied only about 32 to 36 yards of space. This made it possible to leave



the car ends open. As soon as the loaded train reached the unloading point, a ramp was placed at one end of the train. This was built of two 12-inch planks doubled making an incline 14 feet long with a straightway on top 6 feet long.

A Barber-Greene loader then climbed the ramp and waded thru the open end gravel cars starting as soon as it was on the 6-foot straightaway. A swivel spout made it possible to discharge into wagons on either side of the car at any point during its journey. As it was equipped with crawlers, it could pass from one car to another over planks without other supports than the planks themselves.

The actual unloading time for the operation was 1 yard per minute and the average maintained was one car unloaded in 37 minutes, including the time consumed in moving wagons and trailers into place.

PLYMOUTH
Gasoline Locomotives

Predominate in Quarry Service

PREDOMINATE is a fine word. It means ascendent, chief, commanding, controlling, prevailing, regnant, sovereign, supreme, superior.

Superior in power, in numbers, in service. Therefore superior in design, construction, and handicraft.

These virtues have carried the PLYMOUTH Locomotive into a score of distinct industries, and made it the prevailing haulage unit in industrial equipments.

Read the letter in the panel on the right. It is the voice of the man who bought, used, and is glad.

The Fate-Root-Heath Company

THE CONNECTICUT QUARRIES CO.

125 Temple St.

NEW HAVEN, CONN.

The Fate-Root-Heath Co.,
Plymouth, Ohio

Gentlemen:

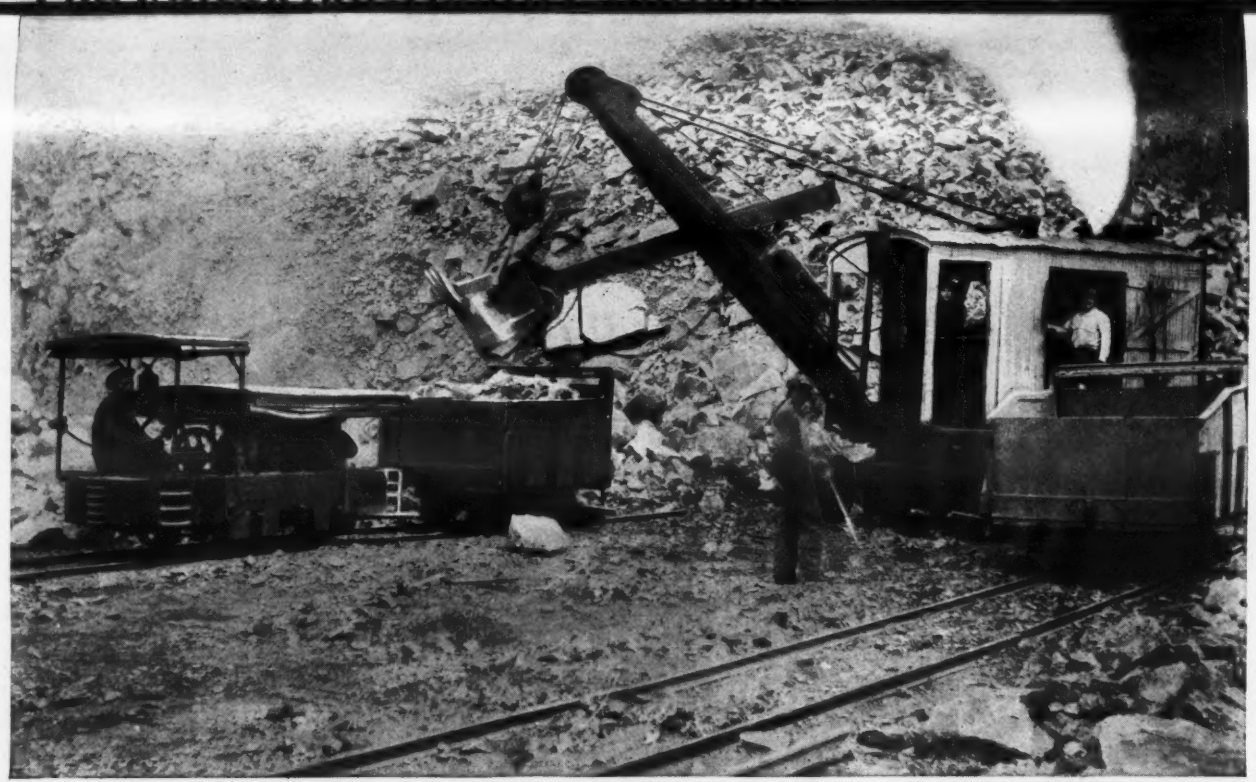
We purchased in February 1918, two PLYMOUTH Locomotives and one in January 1919.

These have been in operation since that time more or less continuously.

From our experience we cannot recommend too strongly the PLYMOUTH.

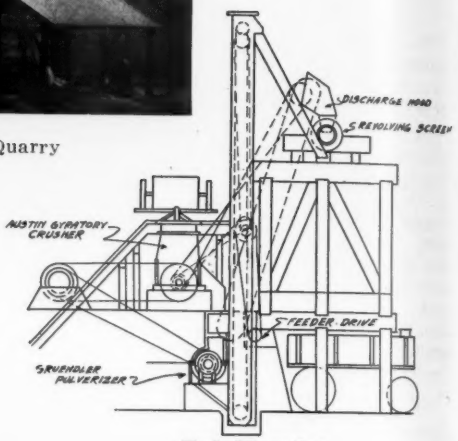
All your selling arguments have been verified and repair costs have been lower than we had expected.

It is with pleasure, from the results we have had, that we offer our hearty recommendation to prospective purchasers of your Gasoline Locomotives.

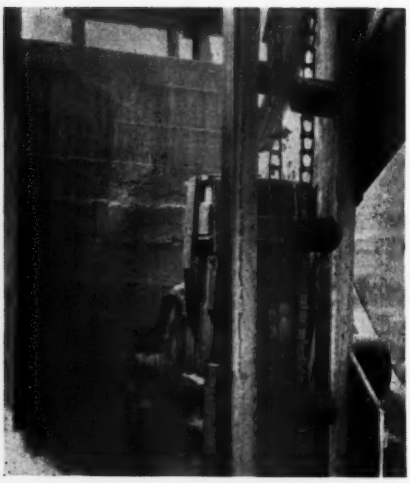


PLYMOUTH in Equipment of Connecticut Quarries Company, New Haven, Connecticut

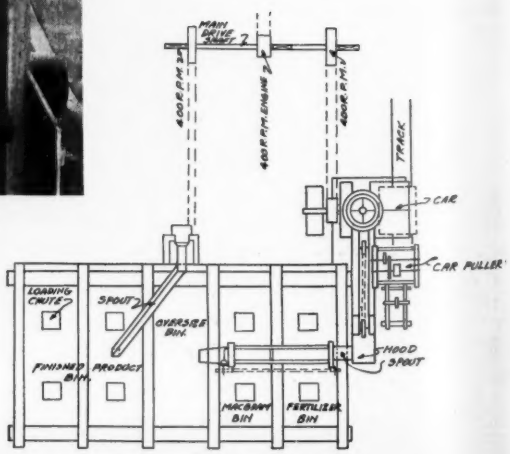
Side of Plant Toward Quarry



End Elevation



Crusher and Elevator



Plan of Plant

See This New Plant

It Is Turning Out Crushed Stone and Agricultural Limestone

The plant shown on these two pages, known as the Jamestown Quarry, was recently opened at Spanish Lake, Mo., near St. Louis.

This plant was designed and equipped by the Gruendler Patent Crusher and Pulverizer Company, of St. Louis, and the photographs and drawings are practically self-explanatory. It has a capacity of 200 tons per day on stone for road work, or about half that amount of pulverized limestone for fertilizer. Its bin capacity equals about two days' output of each product.

The equipment consists of:

No. 3 gyratory crusher.

One XXB heavy duty Gruendler lime pulverizer with automatic feeder.

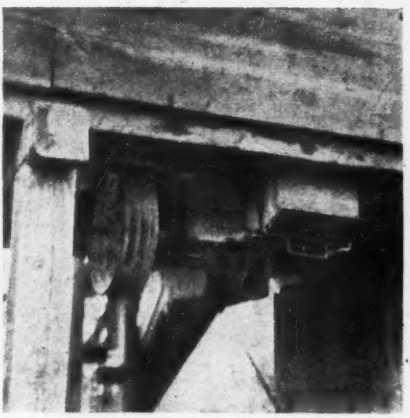
One 36-inch by 10-foot Gruendler revolving screen.

Elevator for raising crushed rock to screen.

Elevator for raising lime dust to screen.

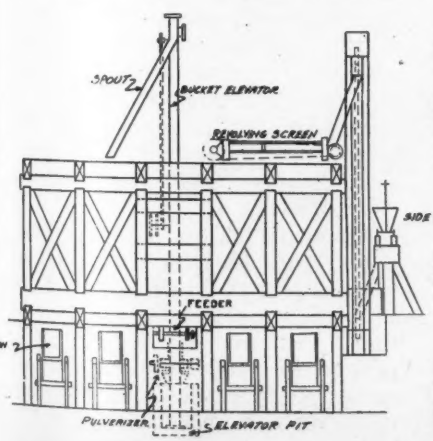
Howe scale.

The plant is a model design for the smaller type of such a plant. The agricultural limestone crusher has a range such that instead of working continuously on screenings, as is so often the case, it takes the oversize from the gyratory crusher and crushes it to dust in one operation. This increases the capacity of the plant, as it is thus unnecessary to pass any material through the gyratory crusher a second time.



Automatic Feeder

The automatic feeder is also a valuable addition to the plant, doing away with practically all attention which would otherwise be given the crusher by the workmen.



The Penderglase Engineering Company has been incorporated with a capital of $50,000, and will erect a gravel pit on the Wabash River, near Grayville, Ill. Directors of the company are George M. Penderglase, Howard Fischer and Bernard S. Alnutt.

The newly incorporated Standard Material Company, 917 Plymouth Bldg., Minneapolis, Minn., has leased 100 acres of land, containing from 5,000,000 to 10,000,000 tons of gravel, just north of Hopkins, Minn. This company is planning to construct a $75,000 cement plant and a $125,000 washing and screening plant, to be completed by August 1st. The officers of the new company are: M. Bullis, pres., John A. Nelson, vice-pres., and J. R. Leak, sales-manager.

The Huron Sand & Gravel Co., has been incorporated with a capital of $15,000, at Marysville, Mich. Incorporators: J. M. Shackett, James Reynolds, G. S. Anderson.

Lime from Dolomite

Ohio Hydrate and Supply Co. Has Very Fine Product

IN its modern plant at Woodville, Ohio, the Ohio Hydrate and Supply Company is producing lime that is noted for its whiteness, purity, plasticity and easy spreading qualities. The material is taken from the dolomitic limestone deposits which occur regularly in that region. It is entirely free from loam or earth pockets, and laboratory tests have shown it to be 99.5 per cent pure. The stone is removed from a face, approximately 55 feet in height. Blast hole drilling is done by drills furnished by the Loomis Machine Company, Tiffin, Ohio.

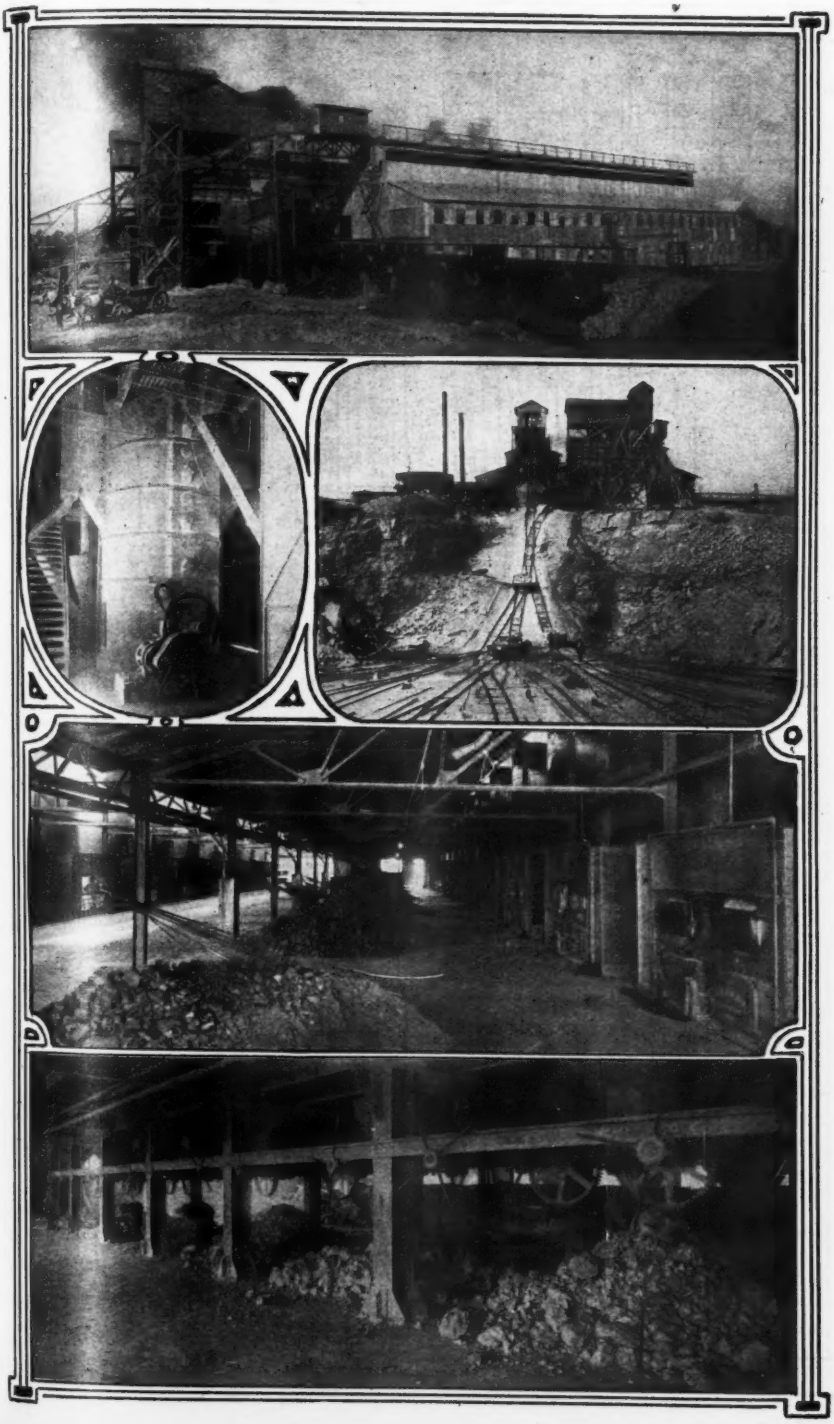
The plant is equipped with two rows of kilns each with two firing floors on either side. The kilns, twenty-four in number, have a daily capacity of 450 tons of finished hydrate. Twelve of these kilns are 36 feet and twelve are 31 feet in height. These kilns were specially designed by the Schaffer Engineering and Equipment Company of Pittsburgh, Pa., who also have the contract covering the engineering and designing

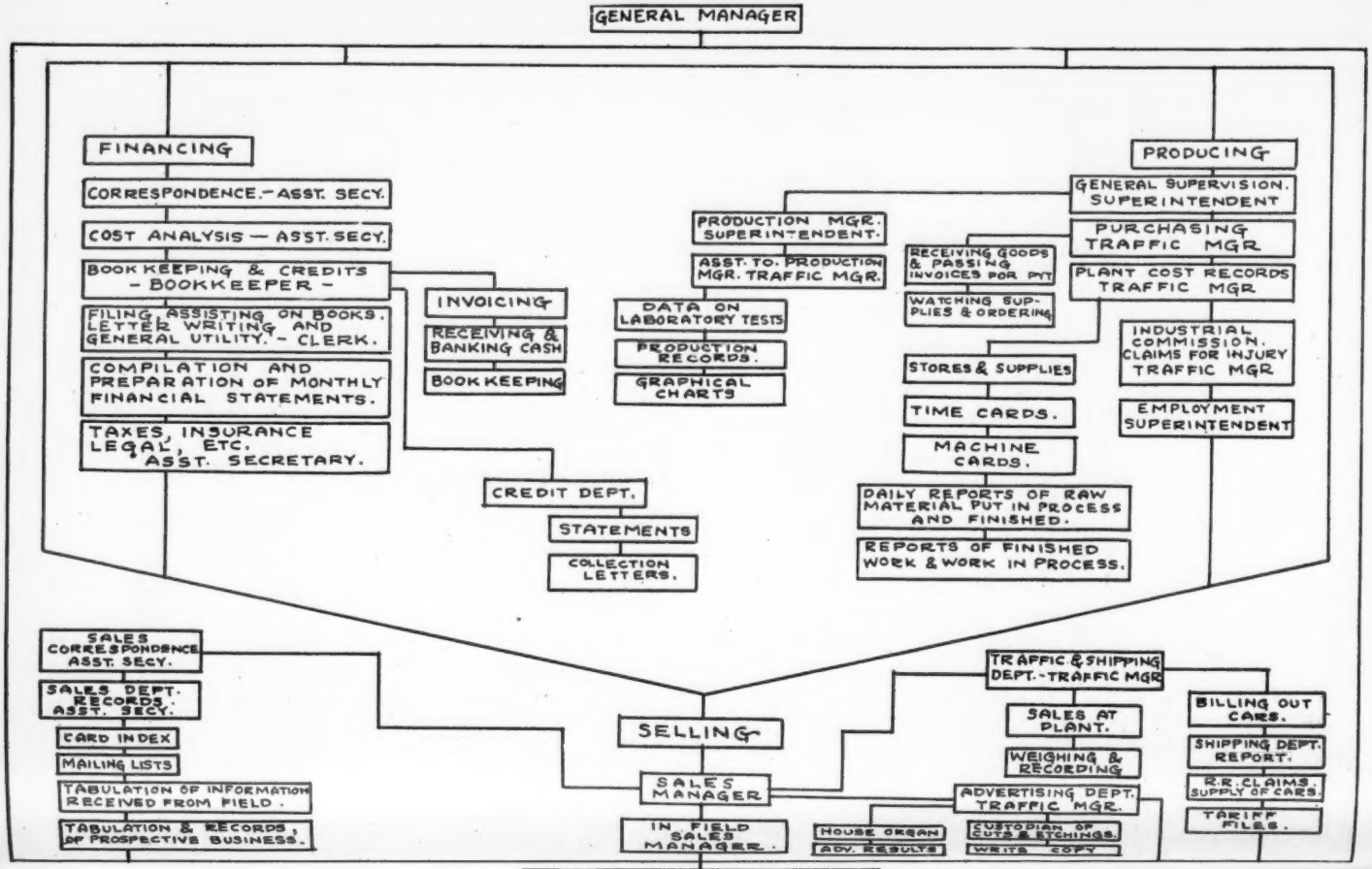
After the kilns have been drawn, and the over-burned and under-burned pieces carefully eliminated, the material is taken by pan conveyor to the crusher from which it is passed by screw conveyor to an elevator and from there to a feeding hopper above a Schaffer poidometer, which accurately portions out the correct quantities of lime and water needed for successful hydrating.

From the poidometer the lime and water pass to a Schaffer hydrator. The present hydrating capacity of the plant is 13 tons per day. The addition of a second Schaffer hydrator will raise the total capacity to 30 tons per day. A new hydrate building is now in process of construction. After the lime has been properly hydrated and cooled, it is delivered to Raymond mills where all the particles of over-burned and under-burned lime are removed by air separation, and the product delivered to finished hydrate bins, from which bags and barrels are packed. Near the loading track is the new warehouse with a capacity of about 1,000 bags of lime. There are loading facilities for 24 cars per day.

Power for this large plant is supplied by an Erie and a Gem City boiler, having a total horsepower of 275. Many of the pieces of equipment throughout the plant are electrically driven. The motors used are furnished by the Ideal Electric Company of Mansfield, Ohio; the Allis-Chalmers Company, of Milwaukee, Wis.; and by the Lincoln Electric Company of Lincoln, Ohio.

The erection of the buildings was managed by the Massilon Bridge & Structural Company of Massilon, Ohio. Webster Mfg. Co. of Chicago, Illinois, furnished considerable of the equipment throughout the plant. Air separating and grinding apparatus was installed by Raymond Bros. Impact Pulverizer Company of Chicago, Illinois. The bagging machinery and bags are the product of the Valve Bag Company of America, Toledo, Ohio. An Ingersoll-Rand Duplex Air Compressor of 270 cubic feet of air capacity is in operation. Hoisting machinery is supplied by the Lidgerwood Company of New York City, stone handing machinery by Barber-Greene Co. of Aurora, Illinois. Screening machinery is supplied by the Stephens-Adamson Company of Aurora, Illinois, refractories by the Harbison-Walker Refractories Co., of Pittsburgh, Pa., and the Pyro Clay Products Co. of Oak Hill, Ohio. Castings and machine work used in the erection of the plant went to the Multiplex Concrete Machinery Co. of Elmore, Ohio.




GENERAL MANAGER
FINANCING
CORRESPONDENCE.- ASST. SECY.
COST ANALYSIS — ASST. SECY.
BOOKKEEPING & CREDITS - BOOKKEEPER -
FILING, ASSISTING ON BOOKS, LETTER WRITING AND GENERAL UTILITY.- CLERK.
COMPILATION AND PREPARATION OF MONTHLY FINANCIAL STATEMENTS.
TAXES, INSURANCE LEGAL, ETC. ASST. SECRETARY.
INVOICING
RECEIVING & BANKING CASH
BOOKKEEPING
CREDIT DEPT.
STATEMENTS
COLLECTION LETTERS.
PRODUCING
GENERAL SUPERVISION. SUPERINTENDENT
PRODUCTION MGR. SUPERINTENDENT.
ASST. TO PRODUCTION MGR. TRAFFIC MGR.
DATA ON LABORATORY TESTS
PRODUCTION RECORDS.
GRAPHICAL CHARTS
PURCHASING TRAFFIC MGR
RECEIVING GOODS & PASSING INVOICES FOR PYT
WATCHING SUPPLIES & ORDERING
PLANT COST RECORDS TRAFFIC MGR
INDUSTRIAL COMMISSION. CLAIMS FOR INJURY TRAFFIC MGR
EMPLOYMENT SUPERINTENDENT
STORES & SUPPLIES
TIME CARDS.
MACHINE CARDS.
DAILY REPORTS OF RAW MATERIAL PUT IN PROCESS AND FINISHED.
REPORTS OF FINISHED WORK & WORK IN PROCESS.
SALES CORRESPONDENCE ASST. SECY.
SALES DEPT. RECORDS ASST. SECY.
CARD INDEX
MAILING LISTS
TABULATION OF INFORMATION RECEIVED FROM FIELD.
TABULATION & RECORDS OF PROSPECTIVE BUSINESS.
SELLING
SALES MANAGER
IN FIELD SALES MANAGER.
TRAFFIC & SHIPPING DEPT. - TRAFFIC MGR
SALES AT PLANT.
WEIGHING & RECORDING
ADVERTISING DEPT. TRAFFIC MGR.
HOUSE ORGAN
ADV. RESULTS
CUSTODIAN OF CUTS & ETCHINGS.
WRITE COPY
BILLING OUT CARS.
SHIPPING DEPT. REPORT.
R.R. CLAIMS. SUPPLY OF CARS.
TARIFF FILES.
CUSTOMER = CONSUMER.

Organization of a Lime Company

By PAUL BOWERS, Assistant Secretary Luckey Lime & Supply Co., Luckey, O.

THE article on page 64 of your May issue is very interesting to the writer who has had charge of organizing the office of our company. The outline given so closely resembles our own (as indicated by the accompanying chart), that we thought you might wish to give us a little space in the hope that it may benefit our fellow manufacturers.

We have what we call a standard practice manual, in which all rules, and the how, when and why of everything which is done in the office, is explained in detail. This makes it very easy to keep the organization intact and running smoothly, in case one of the staff should resign or be taken ill for any great length of time.

The hardest part of going to a new position is to be able to know what to do, and then after you have done it, wondering if it has been done right. With our manual, no one need remember anything but the kind of duties assigned him and by referring to the index of the manual can find out the way his duties are performed. He can go ahead with the feeling that he is doing things according to fixed rules and if he does not do them that way he is leaving himself open to criticism.

The title page of our manual gives the names of the three departments of our organization, financing, producing and selling. It also gives the names of the officers and directors and the names and titles of the various employes.

We believe in giving our various employes titles because it not only enables them to properly sign their letters, but more definitely allocates them in regard to their duties.

Page 2 of our manual contains the organization chart, and page 3 the chart of accounts. Then comes a section containing general information.

Next is the section for the producing department, in which section all the details of the various duties outlined on the organization chart are explained. Topic headings in this section ore "Duties of the Clerk in the Office of the Superintendent," "Payroll Schedule," "Computing Payroll," "Receiving and Checking Goods," "Passing Invoices for Payment," "How to Make Out Factory Reports," "How to File Claims for the Industrial Commission," etc.

The section covering the financing is next and contains the following topic headings: "General Correspondence," which includes the various form letters used; "Invoicing," "Entering in Original Books of Entry;" "Checking of Statements from Creditors, against our accounts payable Ledger;" "Acknowledging Orders;" "Receiving and Banking Cash Receipts;" "Credit Department;" including the routine to be followed when making statements and a series of 8 form collection letters.

The selling section covers the form sales letters used, method of tabulating information received from the field, duties of the shipping clerk and traffic manager and the duties of the advertising manager.

We are very proud of the service we are rendering our customers and feel that is is the result of having our activities well organized and understood by every employe.

William F. Benzel, of Bedford, Ind., has been named the Indiana agent for the Doyle Stone Company, Inc., a New York Corporation, which has qualified to do business in Indiana. The company has 500 shares of stock in Indiana and will do a general quarrying and construction business.

Selecting Workmen for Quarrying

FOR several years past, quarrymen have had a difficult time in obtaining laborers, so that there was little opportunity to select men. It was necessary to employ all that could be obtained in order to keep the plant going, whether they were competent or incompetent. This meant that there were many misfit men at work, and also many that should have been discharged if it had been possible to replace them.

Today things have changed and there is a surplus of men in nearly every locality of the country, so that men as they are employed can be culled over and only the best engaged. Then too, after being hired, the men can be selected for the various tasks that must be done.

Hard and fast rules cannot be laid down or followed to govern these selections, for men vary much in their skill and ease of doing work as well as their strength, and there are always bound to be exceptions to any rule; yet there are some general comments that can be made that will be found helpful in most cases.

Men can be divided into several classes. Namely, large and small men, and the quick moving, and those who are methodical in their movements. The small and medium sized men are generally the quick moving, while the larger, heavy set men are likely to be slower in their movements.

It is these characteristics that can be a guide to selecting men for special tasks, rather than the mental calibre of the men. Everyone will agree that a bright minded man can do better work than one less brilliant, but no one is expecting to hire brains at the wages of a laborer. If by chance they get a man who can think and plan his work it is a decided advantage, but the physical qualities are those most commonly found in the majority of cases and must decide the selection of men, changing them to other positions or jobs as they are able to demonstrate their mental qualifications.

It is obvious that if a man was needed to climb up the face of a ledge and bar out and throw down some loosened boulders that menaced the men working below, a workman who could not climb or was nervous and clumsy would not be selected, but instead an agile climber with plenty of nerve and perfectly fearless, would be given the task.

If this is wise, then it is certainly the part of wisdom to select men for their daily tasks as well as for special ones.

Even in operating with drills it is well to select men. For the deep blast hole drills it is the knowledge that the men have about the work, rather than their physical powers, that must govern the selection; but for tripod drills and hammer drills the physical part is a requisite. The drill runner and his helper on tripod drills should be stockily built and able bodied, as the work of moving and setting up a drill is hard. They do not have to be fast workers, for the drill will set the speed.

For a hammer drill a tall man should be selected, and one of slow, methodical motion with ample strength to raise and lower the drill with a long piece of drill steel in it. A quick man is apt to become impatient and interfere with the proper working of the drill. A short man would find that he has not sufficient height to handle the drill in deep holes and take out the drill and steel easily, or to put in longer drill bits.

Men working at the ledge must be selected according to their tasks. Sledgers should be tall, well built men with broad shoulders, long arms and well developed back muscles. The ordinary custom-made coat that is

tight fitting in the back, even when unbuttoned, denotes well developed back muscles. Such a man will give a longer and more forceful motion to a sledge than a shorter man.

The same thing is true for pickers, and generally speaking the same type of men should be selected as for sledgers.

Short, quick acting men make the best shovelers. As they are lower built this work is not so hard on their backs and they will handle two or three extra shovelfuls in a minute over a tall, slow moving man. Medium height, slight built men with good broad shoulders on them likewise make competent shovelers, especially if they are quick in their motion. For hand stripping this shows the type of men to select for loosening dirt and loading it.

For hand loading of rock into vehicles, especially if a low type of cars or other vehicles are used, as they should be, a low, heavy set type of man should be selected. Some few of this type of men will be slow in their movements, but the larger majority will be quick. These men with good shoulders, arms and back will do more work without tiring than larger men. They generally have greater stamina than the larger built men, and are not so apt to be disorganizers and kickers.

For hauling cars young men should be selected. Their size and build are not so important as the fact that they will walk quicker and farther without feeling tired. Older men do not like to walk and jump around, they prefer to work in some one spot for some length of time, while the younger man is just the opposite, as he likes to get around and to remain in one place is irksome to him. Then too, the young man likes to feel that it is up to him to keep the gang busy and the work going properly.

For work in a dump or for loading cars or trucks from bins the oldest men should be selected. They seldom have to be quick, they have plenty of time to spell and rest themselves and they are more likely to keep accurate records of loads than younger men. When it is necessary they will also trim a car better than will younger men.

For men working around steam shovels as pit men, quick men should be used and generally speaking men with broad hips, built somewhat like a woman. Such men do not tire easily, stay on their feet well and can thus work rapidly for considerable lengths of time, which is necessary when the shovel is running up or trouble occurs.

The same type of men should be used for feeding crushers, when it is necessary to use men for this purpose. These men, like those around steam shovels, should not lack courage and should be alert at all times. Such men mean that the crusher will work to greater capacity.

For firemen the small men do well, although many large men also make good firemen, especially if a slice bar has to be used.

The physical characteristics of a man do not count for much in operating machines. The runners of machines need experience as mechanics and a knowledge of their machines, and small men may do as efficient work as large ones, and vice versa.

The Bedford Nugent Sand and Gravel Company, at Evansville, Ind., has made a request to the board of engineers of the war department of the United States to lease two government barges. The war department is empowered to lease idle river craft, the request said. The two barges are Barge No. 96, now at Spottsville, Ky., and barge No. 95 which is beyond Spottsville on Green river. An investigation is being conducted by the Louisville Office of the war department.

Tunnel and Pillar Formation

New Missouri Lime Plant

AT Mosher, Ste. Genevieve County, Mo., the new plant of the Peerless White Lime Company is now getting into active operation. This company is a subsidiary of the Hunkins-Willis Lime and Cement Company of St. Louis, the business office of the lime company being at Ste. Genevieve, Mo.

This present plant takes the place of a plant which was a while ago destroyed by fire, so that reinforced concrete and steel have been largely employed in the present construction as a protection against any recurrence of such a disaster.

Referring to the birdseye view of the plant the reader will of course identify the kiln building in the foreground, immediately back of which is the storage and shipping warehouse, with the office appearing above the center of it as an added story. To the right are the hydrating plant and power house, with a cooper shop and garage at the extreme left of the picture, and the quarry in the background.

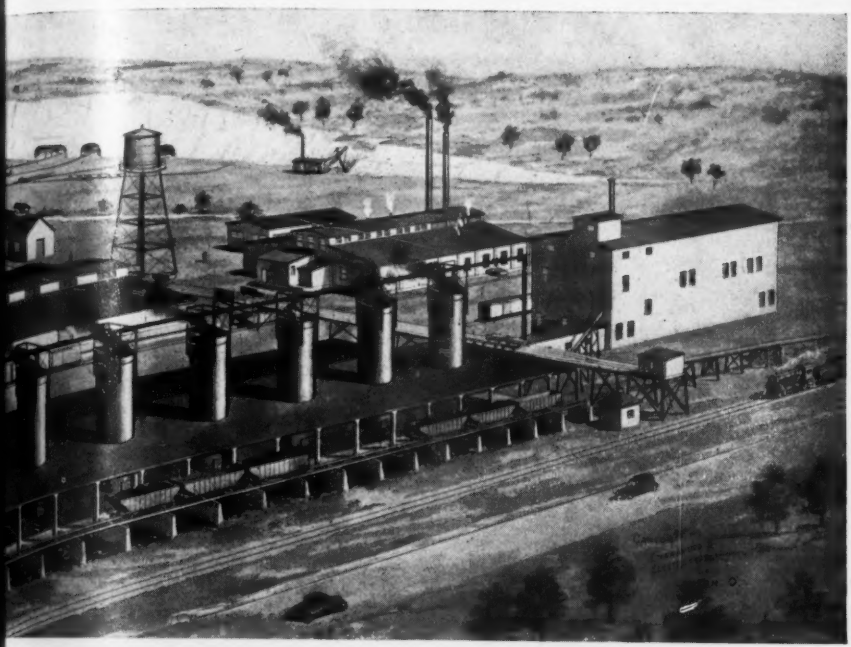
As will be noted from the illustrations mining methods are being used to a considerable extent for taking out the rock. Some open-face quarry work is also being done, employing a Cyclone well drill and two 75-ton Vulcan steam shovels.

In opening up the mining operations a room has been driven 40 feet wide by 12 feet high, and is expected to extend 200 feet back into the deposit. This work is being done with the aid of Waugh Dreadnaught drills, made by the Denver Drill Manufacturing Co. The stone is loaded into quarry cars of 1¼ yard capacity, which are hauled

Kritzer Hydrator Above—Power House Below

General View of P s Whi

Tunneling, with Air Drill in Operation



s White Lime Company

Bagging Machine

Getting Out the Rock

The Lime Shed is 90x300 feet, Light and Well Ventilated

Shipping Lump Lime

up the incline at the end of the kiln building by cable hoist. These cars have removable boxes, which are hoisted from the trucks and carried over the steel frame work, which spans the kilns, dumping automatically in any desired kiln.

There are eight kilns of the straight shaft type, 14 feet in outside diameter. Each kiln is equipped with two small gas producers in which is burned Franklin county (Ill,) coal in nut size. The capacity of the kilns is 20 tons of lime each per day.

It will be noted that the coal is brought in over an elevated track through which it can be dumped to the firing floor.

The hydrator building is constructed of steel frame with outside covering of galvanized iron. It is designed for a two-unit plant, but only one unit has so far been installed. It consist primarily of a Kritzer No. 4. six-cylinder hydrator. Added to this are a Sturtevant crusher of the rotary open-door type, Raymond air separator, and Bates valve bagging machine. This latter is arranged with a hopper beneath, to take care of the spill and return it to the storage bin.

The product analyzes in percentages as follows:

Moisture	00.31
Free lime	00.00
Calcium carbonate	1.29
Calcium hydrate	98.01
Silica	00.11
Iron and alumina	00.09
Magnesia	00.18

It is ground to a fineness of 100 per cent through a 100-mesh sieve, and 99.91 per cent through 200-mesh.

The power house equipment consists of three horizontal tubular boilers, of a total horse power of 300. There are also two Laidlaw air compressors—one double action type with a capacity of 1,100 feet per minute, and a small single machine for emergency use.

The company is now installing a Ruggles-Coles dryer, for drying rock, with a capacity of 9-tons per hour. Crushers will also be installed so that rock of any desired size can be marketed.

The Wayne County Sand & Gravel Co., Detroit, Mich., has recently been incorporated with a capital of $25,000.

Phosphate Features

RETURNS from the U. S. Geological Survey show that the phosphate production for 1921 was only 1,968,000 long tons compared with 4,103,982 tons in 1920. This is cutting the phosphate production a little more than half which together with the fact that prices have been depressing does not sound encouraging on the face of the figures.

As a matter of fact, however, the situation is much better than these figures would imply. It ought to be good for prices that production has been held down, and both production and prices should improve now with the restoring of business activity and the coming of better prosperity to farmers.

Moreover this industry did not suffer more than many others in going through its periods of reaction and readjustment, and now that we have taken the turn and are headed toward better times all around there should be a steady rise both in the quantity of phosphate sold and used, and there should go along with it opportunities for profit in the phosphate business if it is handled intelligently and with the proper degree of cooperation between those engaged in the production and distribution of phosphate.

Mines Produce Bulk of Railroad Tonnage

THAT the railroads of the United States received from mining nearly six times as much freight as from agriculture, nearly four times as much as from manufacturers, and between six and seven times as much as from the products of forests, is developed as a result of a study of the classification of railroad freight tonnage recently made by W. W. Adams, mine statistician of the Bureau of Mines. The figures show that mining products constitute about 56 per cent of the total tonnage from all sources. The tabulation was confined to railroads having an annual revenue of at least one million dollars, and only freight originating on the roads was included.

In a recent year, the freight tonnage from various sources were as follows:

	Tons	Per cent of total
Products of agriculture	115,033,319	10.49
Animals and products	35,493,662	3.24
Products of Mines	589,950,958	53.82
Products of forests	94,075,639	8.58
Manufactures	168,759,153	15.40
Miscellaneous	92,798,540	8.47
Total	1,096,111,271	100.00

A large tonnage derived from mineral products is included in the figures shown under the heading of "Manufactures."

Stone Crushing Progress

ONE of the cheerful things about the reports coming in now from the U. S. Geological Survey on stone production is found in the fact that notwithstanding that they represent an era of depression the stone crushing industry has made progress.

The figures for 1921 show that crushed stone gained 8 per cent while the stone industry as a whole declined 20 per cent. The fact that some gain was scored in the race of depression and of high freight rates which curtailed the commercial trade and the distribution of ground limestone is mighty encouraging. It speaks well for big times in the stone crushing business as prosperity gains headway all around us.

For a year now much of the development has been in local crushing plants for road construction purposes. Road building and street improvement have also kept up the demand for curbing and flagging and also for paving blocks. The indications are that this good work will continue and that there will be added to it when we get more favorable freight rates a

great increase in the general business in crushed stone and in ground limestone.

Another encouraging feature is in the recovery being shown by the metal industries. The depression in the metal lines led to a decrease of 50 per cent in the stone for fluxing and refractory purposes in 1921. With the recovery of this there should come a corresponding increase in the prosperity of the stone industry.

On the whole the outlook is brighter right now for the stone crushing industry than it has ever been, and a proper modification of the freight rates should help bring about a great boom in this industry soon.

Grindstones and Pulpstones Produced in 1921

The output of grindstones and pulpstones in the United States in 1921 amounted to 26,340 tons, valued at $1,227,322, according to figures reported by the producers to the United States Geological Survey, Department of the Interior. This was a decrease from the output in 1920 of over 50 per cent in quantity and of 28 per cent in value.

The grindstones produced amounted to 16,310 short tons, valued at $477,259, a decrease of 63 per cent in quantity and 61 per cent in value.

The pulpstones produced amounted to 10,030 short tons (2,940 pieces) valued at $750,063, an increase of 16 per cent in quantity and 63 per cent in value. The demand at paper mills, which were very active late in 1920 and early in 1921 and which during and after the war could not renew their supply of English stone, increased the market for domestic pulpstones. If the depression that has followed this activity continues there will probably be a considerable decrease in the output of pulpstones in 1922.

The imports of grindstones and pulpstones were valued at $81,880 as against $77,046 in 1920. The exports of grindstones were valued at $281,976 as against $424,322 in 1920.

New Michigan Company

Organization has been completed of the Benedict Sand and Gravel company, of Ionia, Michigan, to open and work a deposit of high-test sand and gravel on the G. A. Benedict property, Easton township, Ionia county, Mich., midway between the towns of Ionia and Saranac.

The company is incorporated at $100,000, common stock, par value $100 per share. It has a thirty year lease on the property which is renewable. The pit is on the main line of the Grand Trunk railroad, between Detroit and Grand Rapids and adjoins the Grand river. Tests made by engineers and state geologists have revealed approximately nine million yards of gravel, about five million of which directly adjoin the water and the railroad.

The Grand Trunk Railway company has agreed to place a siding with a 60 car capacity and the Michigan Securities commission has authorized the company to sell sufficient stock for its equipment and working capital.

Officers are: President, Alfred Fischer, Cornwell Bldg., Ann Arbor; Vice President, G. A. Benedict; Secretary-Treasurer, Richard L. Benedict; Manager, Ralph C. Benedict, all of Ionia. Indications are that all stock will be sold locally.

The company is seeking the services of a high grade practical operator whose advice would be available at once in the layout of the plant, who could direct intelligently subordinates in production and who could develop sales and keep track of contracts. There are no other pits within a radius of several miles on the Grand Trunk railroad that have not been about worked out. Inquiries from persons interested should be addressed to the president.

Production of Gypsum in 1921

According to conservative estimates made by the United States Geological Survey from the incomplete returns available April 1 the quantity of gypsum mined in the United States in 1921 was approximately 2,870,000 short tons, as compared with 3,129,142 tons in 1920. The combined value of the crude and calcined gypsum sold was approximately $20,820,000, as compared with $24,533,065 in 1920.

Explosives Used in March

As the production of coal, iron, copper, and other minerals is often accepted as a fairly accurate index of industrial prosperity or depression, so the consumption of explosives is a more or less correct indication of conditions prevailing in the mining industry, and, to an extent, in industry in general. It is, however, not for this purpose primarily that the U. S. Bureau of Mines is interested in knowing the quantities and kinds of explosives consumed in mining, but rather to learn to what extent permissible or "safety" explosives are replacing the more dangerous and black blasting powder in mining operations, particularly in coal mining. Explosives are responsible for many accidents in mines, and it is necessary to know the quantities, kinds, and place of use to effectively cope with mine-accident hazards due to explosives.

Reports from manufacturers for the month of March, 1922, show that sales during the month totaled 27,390,364 pounds, as compared with approximately 24,708,000 pounds in March, 1921, and 48,740,000 in March, 1920. The figure for March of the present year represents a gain of 10.9 per cent over the same month a year ago and a loss of 43.8 per cent from the record for March two years ago. The quantities given represent about 90 per cent of all explosives sold for use in the United States. Reports were not furnished by several companies whose annual sales comprise the remaining 10 per cent.

Of the total sales in March, 12.3 per cent was permissible explosives, as compared with 10.3 per cent and 9.0 per cent for March, 1921 and March, 1920, respectively; 48.5 per cent was high explosives other than permissibles, as compared with 53.7 per cent and 45.7 per cent; and 39.3 per cent was black blasting powder, as compared with 36.0 per cent and 45.3 per cent.

Coal mining consumed 89.1 per cent of the black powder sold in March, 93.6 per cent of the permissibles, and 18.0 per cent of the high explosives. Other mining operations used 2.1 per cent of the black powder, 2.1 per cent of permissibles, and 40.3 of high explosives. Railroad and other construction work used 4.1 per cent of the black powder, 0.5 per cent of permissibles, and 10.8 per cent of other high explosives. Miscellaneous classes of work consumed 4.6 per cent of the black powder, 3.8 per cent of the permissibles, and 30.9 per cent of other high explosives.

The Erie Pump and Engine Works, Inc., Medina, N. Y., has just issued a bulletin No. 35, on Erie centrifugal dredging pumps. This bulletin shows the different sizes and types of dredging pumps manufactured by this company, with special pages of detailed data on speed, power, etc.

Safety Story Prizes

Wisconsin Association Seeks to Reduce Accidents in This Way

The Wisconsin Mineral Aggregate Association has sent out to its members, posters—one of which is reproduced herewith—offering prizes for "Safety First" stories written by children of employees engaged in the production of sand, gravel and crushed stone. The poster itself is practically self-explanatory.

In sending this poster out to the members, Mr. O. C. Hubbard, executive secretary, says:

"If we can procure the co-operation of every member in the posting of such bulletins and if you will fully advise your superintendents and foremen in reference to the matter, we should receive a large number of interesting stories.

"The effect of this is two-fold.

"1. It will keep everlestingly before the men the importance of carefulness and they will, further, give some thought to 'Safety First' through the inquiries of their children.

"2. If we can partially, through this method, show a decrease in the number of accidents, we will have taken the first step toward removing quarry operation and sand and gravel digging from the hazardous status it is now considered to be in by our own Industrial Commission and by the Companies handling compensation insurance.

"I believe that in the posting of these notices, every member should call to the attention of his superintendent or foreman the importance of creating interest in the matter, among the employees, as our Industrial

To Employees of Crushed Stone Sand and Gravel Producers Affiliated with the Wisconsin Mineral Aggregate Association

Believing the subject worthy of study by everybody and that it has possibilities for a short story, we hereby make offer of cash prizes for the First Second and Third best short stories on "SAFETY FIRST", to be written by children of employees engaged in the production of sand, gravel and crushed stone. *Children of owners of plants are not eligible to compete.* **Stories must be written on plain paper.**

The following rules to govern this contest:

Any boy or girl, up to sixteen years of age, who is a child of an employee of a Member of this Association, is invited to write a story on the above subject.

Story shall not exceed 200 words.

Any feature of the "Safety First" question may be covered and will be considered.

$25.00 in cash will be paid for the story considered best, $15.00 for the one ranking second, and $10.00 for the third.

The contest is open until July 1st, 1922, and all stories received up to midnight of that date will be submitted to the Wisconsin Industrial Commission, at Madison, for the selection of the first, second and third choice.

Stories are to be sent to the above Association, 1018 Railway Exchange Bldg., 97 Wisconsin St., Milwaukee, Wisconsin.

Wisconsin Mineral Aggregate Association

O. C. HUBBARD, Executive Secretary

Commission has suggested that the best stories be used in national publications. This, of course, will go a long way toward giving personal publicity to what we are doing in the promotion of safety and, further, will also give publicity to the company being fortunate in having a child of one of its employees as a winner in the contest."

The Independent River Sand Company has been incorporated with a capital of $250,000, at Moundsville, West Va. Incorporators: J. H. Dorsey, Ernest Frey, Stephen Sternchak, R. E. Heck, Pittsburgh, Penn., and H. L. Allshause, Irwin, Tenn.

Neff & Fry, Camden, Ohio, are making a specialty of the installation of concrete industrial bins for sand, gravel, crushed stone, slate and other purposes. These bins, among other things, are recommended as being fireproof and require no painting or upkeep, the deterioration being reduced 75 per cent. They also reduce the cost of operation, and in addition to these other advantages give the plant a very attractive appearance.

The Typo Sand & Gravel Co., Typo, Ky., has been organized with a capital of $5,000. H. H. Braden, G. S. Greear, and J. D. Kries are incorporators.

Painting Plants

PAINTING has not been much practiced around quarries or sand or gravel pits, for structures erected are not put up for beauty but for use, and paint soon becomes covered with quarry dust or mud. Few deem it expedient to do ony painting, but in many cases paint should be used; for paint of the right kind is a preserver of both wood and metal.

Certain distinctions should be made and judgment exercised in painting. If a crusher plant is to be shut down in the fall of the year for the winter, and the bucket elevator is to be painted, it would be advisable to paint the wood work and also the metal buckets, using grease to cover up the links of the supporting chain. On the other hand if the painting is done in the spring just as the crushing season is to be started it would be a waste of money to paint the metal buckets. The paint in the fall would protect the metal buckets from rusting during the winter, while in the spring it would take only a few days work for the stone to wear the paint off the buckets.

In the fall painting in such a case, several coats should be given the wood work while one coat would be sufficient for the buckets. Other metal work as parts of machines and cars that do not come in contact with the materials produced can, like the wood work, be given several coats of paint.

It must be understood that wood and iron must be painted with different kinds of paint. A paint meant for wood will not give good results upon metal, and *vice versa*. For each material there are special paints made. Another distinction is for metal that is hot, such as boilers and stacks; these should be painted with a hot paint.

A distinction must likewise be made for paint for galvanized iron. The ordinary paints for metals will quickly peel off this metal. If galvanized iron is to be painted then a paint made especially for this metal should be used.

These are some of the things that should be borne in mind, and also that it always pays to use paint for machines, as all metal and wood work are affected by the weather when not painted. The paint preserves these materials.

Accident Rates For Mineral Industries

THE safest branch of the varied mineral industries in which to work would appear to be the sandstone and bluestone quarries, according to data of the comparative accident rates for all divisions of these industries compiled by the United States Bureau of Mines for the year 1920. The lowest fatality rate was found to be for this class of quarries, which employ a relatively small number of men and in which all work is done in daylight, free from many dangers that are inherent in underground mining. For the same year, the highest fatality rate was that for gold, silver, and miscellaneous metal mines, a group that includes all metal mines except those producing copper and iron and those in the Mississippi Valley that produce lead and zinc.

No reports of nonfatal accidents at coal mines are recived by the Bureau of Mines, but for all other branches of the mineral industry the highest injury rate was that for the lead and zinc mines of the Mississippi Valley, while the lowest was that for marble quarries.

Since the enactment of compensation laws by nearly all of the States, increased importance attaches to the accuracy and completeness of the statistical publications on industrial

accidents. The insurance premiums that operators of metallurgical plants, mines, and quarries have to pay are determined largely from a study of statistical reports relating to accidents in these industries. It is highly advisable, therefore, that full and accurate data concerning accidents be reported promptly by operators, not only to aid in the study and prevention of such accidents, but also to assist State compensation commissions and other insurance bodies in establishing premium rates that will be fair and equitable.

As the practical usefulness of statistical reports are increased or diminished by the promptness or tardiness with which the figures are published, the Bureau of Mines hopes that its annual inquiries relating to accidents may be filled out by all operators and returned promptly, in order that the value of the reports of the bureau on this subject may not be diminished by any unnecessary delay in their publication.

The Sac River Sand & Gravel Co., Kansas City, Mo., has commenced the installation of a new plant in the vicinity of Osceola, Mo., to have an initial capacity of about 400 tons of sand and gravel per day. An investment of about $35,000 will be made in the plant and equipment. A. C. Duvall is president.

The Casparis Stone Co., Havre de Grace, Md., has disposed of its local stone quarries to the Baltimore & Ohio Railroad Co., Baltimore, Md. The new owner plans to resume operations at the property at an early date. The quarries have been idle for about a year past. They will be used for the production of rock ballast for the railroad.

The New York Tidewater Gravel Corporation, Dover, N. J., has been organized with a capital of $3,250,000.

The Weldon Spring Quarry Co., St. Charles, Missouri, has been organized with a capital of $100,000.

Misfit Plant Designs

IT is quite surprising in visiting stone, gravel, and sand plants how many places there are in some plants where heavy machinery is installed and no arangements made or provided for making repairs, even when the plants have been designed and their building supervised by an engineer.

To illustrate. In one plant the battery of boilers was located with a brick wall built so close to the fronts of the boiler, that although the stoking could be done, yet it was impossible to replace a tube in the boiler without first cutting a hole through the wall. During the past five years this has had to be done more than a dozen times.

In another case in a stone quarry a large duplex pump was set up with the walls so close to the two ends that the chests and cylinders could not be packed without cutting through the walls.

Frequently to repair chutes, conveyors and screens it is found necessary to take down part of the framing of a building or cut into it. In one case the writer remembers where it was necessary to take out one end of a belt conveyor to make some needed repairs to some of the screws.

The same thing has been true of crushers, changes being made necessary in order to take out the heads or make other adjustments.

These things show the necessity for so designing and building the plant as not only to give economical operation but to admit of easy and cheap repairs, renewals and alterations. The operator is the one to be inconvenienced by such things and must pay the extra cost. Consequently he must see that his plant is so built that these things can be done economically.

Stone Men On The Job

Executive Committee of National Association Preparing for Convention and Other Activities

Pursuant to call of President Eames, the National Crushed Stone Association Executive Committee met at Murray Hill Hotel, New York City, May 1.

After luncheon, President Eames presided at a conference which took up the following matters:

Mr. Hoagland was requested to report anything which the Research Committee, of which he and H. H. Brandon of Ohio Marble Company, Piqua, Ohio, are members, had in mind.

Mr. Hoagland stated that quarry plants have thousands of tons of waste material in the form of screenings and usually dirty screenings, which if properly treated could be converted from waste material into sources of revenue. Mr. Hoagland stated that the Marble Cliff Quarries Company had a screening washing plant which was proving a mighty good investment and that washed screenings were being used for plaster purposes in the city of Columbus and sold at the stone rate. The cost of washing and preparing these screenings for market was very reasonable and that he had no trouble in disposing of clean screenings.

Mr. Rice thought cost of cleaning and preparing screenings for market would be greater than revenue therefrom. Mr. Hoagland stoutly disagreed and gave figures to substantiate his argument. Concensus of opinion was that 6 to 8 per cent of screenings was dirt and foreign material. Mr. Boxley stated that about 25 per cent of his production was screenings. Use of screenings for Agstone purposes was also reported. Agreement was reached that the secretary should query quarrymen as to how much waste they had in screenings and what these screenings were being utilized for.

The secretary presented a letter from James Savage of the Buffalo Crushed Stone Company, in which Mr. Savage said:

"A matter which is causing us some annoyance at the present time is the minimum carload weights established in most railroad tariffs as the marked capacity of the car. This does not give us sufficient leeway in handling rapidly a large volume of carload business. We found in preparing our case for the Public Service Commission that the average loading of all cars shipped by the members of our Association in 1919 was 49.7 tons, which surely should be satisfactory to the railroads. In comparison with other minimum carload weights, we find that crushed stone is one of the few commodities handled at marked capacity of car. We should have this minimum reduced to 80,000 lbs. or 80% of the marked capacity of the car. If the National Association can help in a general adjustment of minimum carload weights, for crushed stone, its efforts will certainly be appreciated."

Considerable discussion was had on this topic. Mr. Freiberg moved and Mr. Hoagland supported a motion that the National Crushed Stone Association go on record as favoring a loading leeway of 10 per cent below marked capacity of car to 10 per cent above, and that the secretary take necessary steps to bring this matter to the attention of railroad and other officials. The motion was agreed to.

President Eames requested that action be taken in the matter of fixing time and place and program for the next National Crushed Stone Convention. Mr. Freiberg expressed belief that the best interests of the industry would be served by holding our annual convention at the same time and place as the American Road Builders Association hold their Road Show and Convention. The secretary stated that Ex-President, E. J. Krause of the Columbia Quarry Company, St. Louis, and Mr. L. H. Hawblitz of the France Stone Company, Toledo, Ohio, had received invitations from New Orleans, La., and from Mobile, Alabama, to hold our convention in those cities. After discussion, Mr. Freiberg moved and Mr. Gucker supported a motion to hold our next annual convention at the same time and place as the American Road Builders and directed the secretary to govern himself accordingly. The motion was agreed to. Rumor has it that Cleveland, Ohio, may get the next Road Builders Convention and Road Show.

The Research Committee is expected to have an interesting report to make at the next convention on the possibilities of enlarging the uses of crushed stone, lessening waste and reducing costs.

New Gasoline Industrial Power Units

The Waukesha high torque motors are offered by the manufacturers—the Waukesha Motor Company of Waukesha, Wisconsin—as industrial units which have a wide range of applications. Designed to furnish producers with portable or stationary four cylinder power plants, with belt-horsepower ranging from 15 to 45, these motors combine many features that are particularly desirable in pit and quarry fields.

An apt illustration of the ways in which this motor serves the field is furnished by the fact of its inclusion in machines such as those produced by the Chain Belt Company, Ingersoll-Rand Company, Clyde Iron Works, Geo. D. Whitcomb Company, Koehring Company, and Pawling & Harnischfeger.

A series of units to meet power requirements most economically, have been produced by the Waukesha Motor Company. Blue prints and specifications will be submitted upon request.

A New Vibrating Screen

James B. Seaverns, engineer and contractor with offices in the Peoples Gas Building, Chicago, has just designed and produced a new vibrating screen, claiming for this machine that it is the simplest and most effective vibrating machine for grading various materials, such as stone, gravel, sand, cement, lime, etc. The screen is constructed of steel throughout, without the use of friction parts or cams.

It has been installed in several plants, and is operating efficiently and economically in the separation of various materials. It operates on about ½ H.P. A wide range of sizes is made possible by the changeable mesh of the screens with which the machine is equipped.

The Bradley Pulverizer Company, Allentown, advises that the entire 1922 edition of its American Cement Directory is exhausted, so that the company will not be in a position to furnish additional copies.

The Cairo Sand & Gravel Company, Cairo, Ill., has increased its capital stock from $30,000 to $50,000.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trademark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,412,868. Mining machine. Morris P. Holmes, Claremont, N. H., assignor to Jeffrey Mfg. Co., Columbus, Ohio.

1,412,922. Excavating machine. William Collatz, Chicago, Ill.

1,413,644. Crushing mill. Francis O. Williamson, Chicago, Ill.

1,414,056. Mine car. George E. Thackray, Westmount Borough, Pa.

1,414,156. Grizzly or screen for grading material. William Ross, Chicago, Ill.

1,414,222. Regulating valve for rock drills. Fred M. Slater, Easton, Pa., assignor to Ingersoll-Rand Co., Jersey City, N. J.

1,414,224. Rock drill. William A. Smith, Phillipsburg, N. J., assignor to Ingersoll-Rand Co., Jersey City, N. J.

1,414,225. Rock drill. William A. Smith, Phillipsburg, N. J., assignor to Ingersoll-Rand Co., Jersey City, N. J.

1,414,398. Shoveling machine. Howard B. Dennis, Grass Valley, Cal.

1,414,586. Coal cutting machine. Arthur Russell, Hucknall, England.

1,414,799. Crusher. Arthur F. Williams, St. Louis, Mo., assignor to Williams Patent Crusher and Pulverizer Co., same place.

1,414,832. Excavating machine. Dominick A. Rossi and Forrest Reynolds, Cleveland, Ohio.

1,414,877. Mining apparatus. Edward L. Hopkins, Columbus, Ohio, assignor to Jeffrey Mfg. Co., same place.

1,415,223. Excavating and loading device. George C. Crossley, Trenton, N. J.

1,415,544. Excavating apparatus. Standley Gautereaux, Los Angeles, Cal.

1,415,561. Excavator. Peter W. Hill, Dorchester, Mass.

1,415,957. Rock drill. William A. Smith, Phillipsburg, N. J., assignor to Ingersoll-Rand Co., Jersey City, N. J.

1,415,958. Automatic air-feed control for rock drills. William A. Smith, Phillipsburg, N. J., assignor to Ingersoll-Rand Co., Jersey City, N. J.

Pittsburgh Market Good

Demand Has Largely Increased During Past Month

The past month has brought about a marked increase in sand and gravel production in the Pittsburgh, Pa., district with corresponding advance in demand. There is a keen call for material for spring operations and the leading producers are making every effort to supply the requirements. Many barge loads of river sand are reaching the local port, and there is little, if any, accumulation of stocks, current call just about absorbing the allotments.

The Rodgers Sand Co. is working on the Monongahela River, near the Wabash Bridge, with its sanddigger "Charlotte" and numerous tows, heavily loaded, are leaving this point; operations are also being conducted in the vicinity of Ambridge.

The Keystone Sand & Supply Co is maintaining production at Coraopolis and a fine grade of material is being secured from this district, finding ready sale in the Pittsburgh market. The Iron City Sand Co. is operating with its sanddigger "Progress" under good capacity.

Washed gravel at Pittsburgh is bringing $1.60 a cubic yard, f.o.b. float, while on the dock the material is priced at $2.00. Under longer haul the quotation is from $2.50 upwards. River sand is bringing $2.40 a ton, delivered on the dock. In the wholesale market crushed stone, 1½ and ¾-inch stocks, is selling for $3.25 a ton, while delivered on the job the material runs to $5.00 and $5.50. Portland Cement is priced at $2.00 a barrel in carload lots, f.o.b. city, as against a quotation of about $2.40 a year ago. Retail the material is bringing $2.80 a barrel, with bag rebate of 10 cents.

At the Pittsburgh, Pa., Experiment Station of the Bureau of Mines cooperative work with the Institute of Makers of Explosives on the variation of cartridge diameters is in progress. A study is being made of the strength and sensitiveness of certain high explosives as determined by the rate of detonation and gap tests. The results obtained show, in general, that the rate of detonation and sensitiveness by gap tests increase with increased diameter of cartridge.

Sees Much Improvement

S. W. Straus & Co., large lenders of money for new buildings, say with regard to the building situation:

"There is a good demand for funds to carry on new building operations. The general fundamental conditions in the situation are now so nearly normal that since January 1 we have underwritten building loans amounting to $43,980,000, of which $26,510,000 was for apartment houses, $12,350,000 for offices and loft buildings, and $5,120,000 for miscellaneous structures. If the demand continues at the same rate, and fundamental conditions seem to so indicate, we shall be in a position to loan approximately $100,000,000 more to finance new building construction during the balance of the present year.

"That the present encouraging conditions are nationwide in character is indicated by the widely scattered range of these financial underwritings which include loans in fourteen cities and thirteen states, as follows: New York, Chicago, Philadelphia, Boston, Atlanta, Detroit, Fort Worth, Cleveland, Birmingham, Dallas, San Francisco, Kansas City, Seattle and Portland, Oregon."

Potash in New Area of Texas

The discovery of potash in notable amounts in a new area in Texas is announced by the U. S. Geological Survey, Department of the Interior. The new discovery is brought to light through the analysis by the Survey of drill cuttings collected from the Santa Rita No. 1 well, drilled by the Texon Oil and Land Co., in the southwest corner of Reagan County, Texas. Most of the samples contained no potash worth noting, but the sample which, according to the driller's log, was taken from bailings after drilling from 1150 to 1165 feet, contained the equivalent of 2.46 per cent of K_2O; that from 1175 to 1182 feet, 5.63 per cent; 1155 to 1265 feet, 5.65 per cent; 1265 to 1275 feet, 2.50 per cent; 1275 to 1283 feet, 6.38 per cent; 1283 to 1293 feet, 7.88 per cent; 1293 to 1300 feet, 4.00 per cent; 1310 to 1316 feet, 2.05 per cent, and 1316 to 1325 feet, 8.29 per cent K_2O. This, the richest of the samples, indicates 10.78 per cent of K_2O in the soluble salts when

one gram of the dry rock is dissolved in 100 cc of water.

The well was drilled by standard rig. Accordingly the amount of salt taken in solution by the water used in the process of drilling and bailing is not known. Therefore these cuttings, while significant as disclosing the presence of potash salts in this region, which is 120 miles from the Means No. 1 well in Loving County and 55 miles from the Bryant well in Midland County, where also, according to previous announcements of the Survey, potash deposits are present, do not furnish adequate information as to either the precise thickness of the potash beds nor the richness of any considerable thickness of salts penetrated by the drill. Core drilling is needed to furnish definite information.

Phosphate Rock in 1921

According to conservative estimates made by the United States Geological Survey from the incomplete returns available April 1, the quantity of phosphate rock sold in the United States in 1921 was about 1,968,000 long tons, valued at $10,928,300, as compared with 4,103,982 long tons, valued at $25,079,572 in 1920.

The total production of Florida was approximately 1,675,000 long tons, valued at $9,036,000.

Tennessee followed with an approximate total of 293,000 long tons, valued at $1,892,300, which included a small quantity of brown rock from Kentucky.

The Western States were represented by only one producer, and South Carolina dropped out entirely.

The general business depression of 1921 is illustrated in the decline of the phosphate rock. The decrease in the selling price of agricultural products, combined with the high freight rates, prevented farmers from purchasing fertilizer, and the low rates of exchange discouraged exporters in the industry.

Frank Vera, unsuccessful candidate for mayor, at the last election in New Bedford, Mass., has purchased a large block of shares in the Blue Stone Quarry of that city. During his campaign Mr. Vera attacked the Blue Stone Quarry, declaring that the city had favored the quarry in municipal contracts.

Illinois Activities

Executive Committee Elects Sorenson Vice-President

A meeting of the executive committee of the Illinois Concrete Aggregate Association was held at the office in Chicago on May 8th.

Consideration was given to the matter of the proposed fire tests on concrete building blocks. The secretary was instructed to send an appeal to all producers in Illinois asking that they support these tests in the interest of an increased use of sand and gravel.

Mr. A. S. Sorenson was elected vice-president and member of the executive committee to fill the place made vacant by the resignation of Mr. G. P. Longwell.

It was decided to hold the regular quarterly meeting of the association at Chicago on Thursday, June 15th. The secretary was instructed to notify the members of the call, the program to be announced later.

Calcareous Marl in 1921

The output of calcareous marl in the United States in 1921 amounted to 53,730 short tons, valued at $183,743, according to reports made by the producers to the United States Geological Survey, Department of the Interior. The quantity decreased 45 per cent and the value 43 per cen as compared with 1920. In 1921 the average value per ton was $3.42; in 1920 it was $3.31. Nearly all the calcerous marl sold in the United States in 1921 was used for liming the soil. Some was used as a filler in patent fertilizers. More than 63 per cent of the total output—33,978 short tons—was produced in Virginia and was valued at $105,821. The other producing States were California, Maryland, New York, North Carolina, Ohio, Pennsylvania, South Carolina, and West Virginia. Deposits were developed in Michigan and Wisconsin.

The Kentucky Sand Co., Newport, Ky., has been incorporated with a capital of $60,000. Incorporators: Fred E. Hall, Douglas P. Hall and C. S. Hall.

Big Cement Shipments

Lehigh District Working Toward a Record—Other Mill Notes

There is a literal boom in cement production in the Lehigh Valley section of Pennsylvania, and practically every mill is being pressed into service. Orders are piling up well in advance of shipments, insuring operations under peak conditions for some time to come. The stability of the market and advance in prices is lending impetus to the situation, and everything looks auspicious for record figures in manufacture and distribution.

May 16 proved the biggest day in shipments from this section during the present year, no less than 50,000 barrels of material, requiring about 200 freight cars, moving away. The bulk of this distribution was from the mills of the Lehigh Portland Cement Co., practically the only producer hereabouts having any reserve on hand. The other mills are trying to make up for lost time, but incoming orders are absorbing too much material to make the holding of any sizable stock possible.

Despite the coal strike, the mills are quite well situated with regard to fuel supply, and the heavy orders placed for coal months ago, when the strike was first anticipated, are now indcating their value. Heavy production is impossible without bituminous fuel and present stocks are entirely sufficient for all immediate demands.

With a mill base of $1.75 in the Lehigh Valley section, an early increase is anticipated. This figure is carload lot price, less bags. In the Universal section, $1.80 is the prevailing mill quotation.

Practically all the mills in this district have made an advance in wages since the first of May. The Atlas Portland Cement Co. and the Lawrence Portland Cement Co., led the movement, quickly followed by the Lehigh Portland Cement Co., the Giant Portland Cement Co., and others.

The last noted company has resumed operations at its mill at Egypt, Pa., have a long idleness, dating back to last summer. This plant, known as the Central Mill, is only used when the Reliance Mill of the company is unable to care for orders, giving an indication of the heavy demand now prevailing for material.

The Atlas Portland Cement Co. is maintaining capacity operations at its plant at Northampton, Pa., and production at the bag factory, recently resumed, is going forward under heavy output. Large shipments are leaving this mill daily.

The Coplay Cement Co., Coplay, Pa., is running full with entire ten kilns at its Mill C, and expects to place Mill B in service at an early date. For a number of weeks past a crew of men has been engaged in getting this latter plant in readiness, making repairs and cleaning up the property. The company has called a special meeting of stockholders on June 15, to vote on a proposition to increase the indebtedness from $500,000 to $1,250,000. George A. Christ is secretary.

The Lehigh Portland Cement Co., Allentown, Pa., is running full at all its plants with the exception of Mill A, and this plant, it is said, will be placed on the active list in the near future. As noted above, this company has been able to accumulate a large reserve and will reduce its stock before complete capacity production at all of the mills.

The Whitehall Portland Cement Co., Cementon, Pa., is increasing operations at its local quarries, situated between Cementon and North Coplay, and a number of heavy blasts recently have been fired. The company is maintaining active production at its cement mill.

The Bath-Portland Cement Co., Bath, Pa., is running under good production at its mill and sizable shipments are leaving the plant. This mill is now operating on a daylight saving time schedule.

Current mill prices in various cement districts hold to the following base: Hudson, N. Y., $1.90 a barrel; Buffington, Ind., $1.70; Mitchell, Ind., $1.95; Hannibal, Mo., $1.85; La Salle, Ill., $1.75; Leeds, Ala., $1.95; Kingsport, Tenn., $1.95; and Steelton, Minn., $1.75. It is expected that a number of these quotations will advance at an early date.

New Jersey cement plants are feeling the buying movement and heavy market activity, and are responsive to the call. Production has been increased to close to capacity at the mills at Vulcanite and New Village. At the first noted plant, operated by the Vulcanite Portland Cement Co., an advance has been made in the wages of laborers from 24 to 30 cents

an hour. The Edison Portland Cement Co. at New Village is running full in practically all departments, and has also made an increase in the wages of workers, about 5 cents an hour. The mill is now giving employment to about 450 operatives.

The Hudson Valley Portland Cement Corporation, Alsen, N. Y., is pushing construction work on the third unit of its finishing department, and plans to have this portion of the plant ready for operation in July. With a present output approximating 780,000 barrels a year, the capacity will be increased to 1,140,000 barrels with the operation of the new department, and contracts have been placed for this entire amount during the present year. The plant is now running on a capacity basis with regular working force, and arrangements are being made ot increase the number of employes for the new mill extension. To provide for general expansion in operations, and to defray the cost of the plant additions, the company is disposing of a bond issue of $1,000,000.

The Kansas City Cement Co., Kansas City, Mo., is increasing production at its plant, and has recently added about 150 men to the working quota. It is expected to increase this number of operatives at an early date, bringing the mill up to normal output.

The New Egyptian Portland Cement Co., Fenton, Mich., is arranging for capacity operations at its mill for an indefinite period, with regular working quota. The company has secured a contract for furnishing material for the state Highway Department for a number of important new roads, with order aggregating about $250,000 in valuation. It is said that this is one of the largest orders ever placed for cement with one company by the department.

The Hochelaga Cement Co., Ltd., Montreal, Que., recently organized with a capital of $3,000,000, is perfecting plans for the operation of a new cement mill in this vicinity. The proposed plant will have an initial capacity of approximately 2500 barrels a day, and this output will be increased to about 5,000 barrels in the near future. To provide for the construction of the plant and machinery purchases, the company is arranging for a bond issue of $2,400,000, a large part of the proceeds to be used for such purpose.

Attack Cement Tariff

Hitchcock Says It Will Aid the Men Now Under Federal Indictment

By Our Washington Correspondent

A fight on the duty provided in the pending tariff bill on cement, which has just come to the front in the Senate, may result in the restoration of Portland and other hydraulic cements to the free list, with a provision for tariffs against countries which discriminate against American exports of the commodity. The pending bill provides a duty of 5 cents a hundred pounds on this commodity.

A suggestion that the bill be amended was made by Senator Smoot, of Utah, ranking Republican on the Senate finance committee, and it is expected that the committee will take up the matter. Meantime, the Senate approved a duty of 20 per cent ad valorem on other cements, this representing an increase of 3 per cent in the rate in the House bill.

Resuming the Democratic attack on the hydraulic cement rate, Senator Hitchcock, of Nebraska, read the indictments returned by a Federal grand jury in New York against what was characterized as the Eastern and national cement trust, and declared that the tariff proposed would further aid manufacturers who now were being proceeded against by the Department of Justic for violation of the anti-trust laws.

Senator Townsend, Republican, Michigan, in whose state great quantities of cement are produced, said that all that was desired was protection against the Canadian producers.

Flint Rock has been discovered in enormous quantities at Brooksville, Fla., shafts having been sunk to a depth of 40 feet without reaching the limit of the flint stratum. A Brooksville firm is already engaged in installing permanent equipment for quarrying and crushing the rock, and planning to erect an entire plant, including cottages for the employees. The rock is pronounced by experts to be of the highest quality and is valuable for use as ballast on road beds, and also for use in reinforced concrete construction.

Oppose Limit on Road Building

Dunn Bill Is Unpopular Among Big Majority of Highway Advocates

By Our Washington Correspondent

Highway officials, engineers, motorists and good roads advocates generally are up in arms over the action of the House in passing the Dunn federal aid road bill, which, they say, will seriously interfere with highway construction in 1923 and 1924, as it limits the amount of federal aid to be allotted for any mile of road during 1923 to $12,500 and during the succeeding year to $10,000, instead of the maximum of $20,000 per mile now provided. Highway officials and engineers declare that the Dunn bill will seriously curtail the construction of the higher types of roads and the building of wider roads in the vicinity of large cities, where they are becoming increasingly necessary.

The bill authorizes an appropriation of $65,000,000 for the year beginning July 1, and an appropriation of $75,000,000 for the year thereafter. The appropriations for a period of two years were authorized because every witness appearing before the committee on roads had stressed the importance of providing for at least two years to enable State highway departments to know in advance the sums to be available from Federal sources and to make their plans accordingly.

"With the appropriation proposed," said a report submitted by Chairman Dunn, of the House Committee, "a majority of the States can carry on their road building programs as heretofore contemplated, while some few will find it necessary to curtail their building programs to meet the appropriations authorized. Since operating under the law now in existence, it has been found by the Secretary of Agriculture that the Federal government could participate in the construction of a grade operation which passes over a railroad, but could not do so if conditions were such as to compel building under the track. As the law will not permit the approval of a project for construction of a primary road over a primary railroad at grade, it was deemed essential that the law be amended so as to permit participation in underpass as well as overhead construction."

A section of the bill would accomplish this, said Mr. Dunn, adding that under present law, when once a road project was approved, and the money set aside, and the project later abandoned, no way had been found by which the money could be recovered to permit a State to use it on another project. It remained to the credit of that particular project indefinitely, but provision had been made in the bill, he said, to correct this situation.

Another section provides that the Secretary of Agriculture shall continue to approve projects of States for five years after passage of the bill if he should find the State had complied with the provision of the general road act insofar as its constitution and law would permit. A penalty clause, the first to be written in road legislation, was designed, Mr. Dunn said, to guarantee the work and to prevent false statements as to costs or work performed.

But Mr. Dunn's views of the adequacy of his bill are not supported in a great many quarters. Ordinarily, the federal government pays 50 per cent of the cost of federal aid roads. If the proposed measure should pass the Senate also it will limit the cost of federal aid roads the first year to $25,000 a mile and the second year to $20,000 a mile, unless the states, counties and municipalities provide more than half the funds needed. For them to do so, of course, will mean increased taxes, for the higher types of roads now demanded by the public cannot be constructed at figures such as the proposed measure would specify, it is claimed.

Where a roadway wider than 18 feet is necessary the aid would relatively be a very small proportion of the total cost. An unsound public policy such as that back of the proposed measure is a serious menace to the construction of better and safer highways, it is held by those opposing the bill. Any policy that puts an obstacle in the way of reducing highway accidents is very unwise, to say the least, is their claim. This proposed limitation will do that very thing, it is pointed out. Automobile accidents, the majority of which occur near the great centers of population,

are causing an alarming loss of life and injury both to pedestrians and motorists. One of the remedies for this condition is the construction of wider highways. To prevent their construction, therefore is directly contrary to the public welfare, opponents of the bill hold.

The revenues of the federal government are derived largely from the great centers of population, since it is in those centers that the collections are the heaviest. When the benefits of federal aid are passed out in the form of good roads it is inconceivable, say the opposition, that a limitation should be made that will strike directly at the welfare of the taxpayers, who carry so large a portion of the tax burdens.

While the House has taken action on the Dunn bill, the Joint Congressional Commission of Agricultural Inquiry, whose general conclusions on the subject have just been announced, believes large expenditures will be necessary to bring the two and a half million miles of rural highways in the United States up to the standard of efficiency comparable to their extended use in motor transportation. The commission, Chairman Anderson says, will recommend that Congress continue to promote an adequate program of highway construction and maintenance directed to the more effective correlation of highway transportation with rail and water transportation, and that the states and counties also continue their highway programs with particular reference to farm-to-market roads.

America's far-flung net of roadways is soon to be measured accurately in terms of mileage, cost, character of construction, improvement work, and general condition by the Bureau of Public Roads of the Department of Agriculture. The survey, which is the most extensive ever undertaken and the first in seven years, is made with the aid of State and local officials and individuals the country over, and is comparable only to the great task of taking the national census. Nobody, in all probability, could guess today within millions of dollars what the roadways total, in dollars and cents, on the ledger of national assets. Nobody knows how many miles there are where wheels may roll. The strength and the weakness of the nation's transportation arteries likewise are unknown in detail.

When the survey is completed, all these and other facts will be known, and will be available for guidance to road builders. In addition there will be abundant data to show up comparisons of costs. The well-built roads of, say, Illinois can be laid, dollar for dollar and mile for mile, alongside the well-built roads of California and other States. First cost and maintenance of macadam, asphalt, concrete —every kind of road built—from one section can be matched against such costs from every other section, if desired. The way to make the dollar most effective in road work thus will be pointed out.

Rural highways as well as urban are to be included, the latter embracing all roads, streets, and alleys in incorporated communities of 2,500 inhabitants or more. How the funds are provided for constructing and maintaining roads also will be made known. The amount invested in road machinery—an item concerning which even approximate information is lacking today—will be sought. After the information is obtained it will be kept up-to-date.

In undertaking the survey, the bureau requests the assistance of every unit of government doing road work in the nation; of road officials the country over; and of associations, organizations, and individuals, down to the man with the flivver, having information or data as to local highway activities. As future legislation may be based on percentage of road mileage, it is pointed out that it is essential for each unit to have its total, as wel las its improved, road mileage carefully and correctly recorded in the survey.

Road material surveys now being made in several states will give contractors a more definite basis for bidding on road work and result in cheaper costs of construction, says the bureau. In making these surveys, supplies of stone, gravel, sand, slag and other materials are located, samples tested and information secured as to accessibility, freight rates, and other factors. This information is of permanent value as supplies are rarely exhausted. By furnishing a contractor information as to the location of satisfactory materials one element of risk is removed, and some of the states report that they have definite proof that such service has resulted in decreased bids.

Sees Shortage in East

Other Prophecies of Our Correspondent Coming to Pass

By Our Eastern Correspondent

There has been a marked rebound in trade in the sand, gravel, crushed stone and kindred material markets. The anticipations of producers for an active demand during the spring season have been more than realized, and the prophecies in this respect in these columns in recent issues are coming to pass with a vim—so much so that a condition of absolute material shortage now looms in sight with a number of commodities.

Sand and gravel in the Long Island districts, and in New Jersey, are keeping up with the call to the best of their ability; overtime work now prevails at a number of plants and large shipments are being made. The demand for crushed stone for highway construction is heavy, and with the hindrances caused by the recent strike in New England quarries, the situation is coming to a point where orders are in excess of supply, and where the purchaser must wait his turn.

With prevailing conditions as outlined, needless to say that there is marked firmness in price levels, and every indication that other materials will follow the trend of Portland cement and brick, and show advances at an early date. There is a strengthening aspect with every business day, and with the season well advanced in the weeks to come, the demand is certain to grow. The producer or manufacturer, as the case may be, and the dealer in building supplies is coming back into his own.

Best grade gravel holds at $1.75 a cubic yard in the wholesale market for 1½ and ¾-inch standard material; a year ago this time, the price stood at $2.50, and a nearby $2.00 level seems quite certain. Local dealers are asking $2.75 for the material, delivered on the job.

Clean, white sand is being quoted at $1.00 in cargo lots, per cubic yard, to contractors, as against a figure of $1.25 a year ago. The retail price maintains at $2.00, delivered, while fine, sharp beach sand is now priced at $4.50, retail, as compared with a level of $5.00 through the winter season.

Crushed stone is very firm at $1.65 and $1.75 per cubic yard, wholesale, for 1½-inch and ¾-inch stock, respectively. Dealers are holding firmly to a $4.00 figure for both sizes, delivered on the job. Road contractors are experiencing difficulty in securing immediate shipments of desired material, and are paying, approximately, the wholesale levels noted, f.o.b. city, or nearby point of delivery.

Portland cement is operating under a heavy demand and is rapidly reaching higher levels. A rising market was intimated in the last issue of PIT AND QUARRY, and the range has gone beyond expectations. From $2.30 a barrel, wholesale, as quoted in May, the price jumped to $2.40 and then $2.50, and now it stands at $3.70 and $3.75. While there is certain stability at these figures, some dealers are looking for still higher quotations. Supply dealers, correspondingly, have advanced their prices until a level of $3.25 a barrel has been reached, with regular bag rebate of 10 cents, as heretofore. With the Portland cement market as a criterion of what is ahead, dealers are sanguine of the most prosperous season ahead for many months past.

The warehouse price on common hydrate lime maintains at $12.50 a ton, while finishing hydrate ranges from $16.00 to $16.80. Common lump lime, wholesale, is $2.75 to $3.15 a barrel, and finishing lime, $3.70 a barrel. In the retail market, hydrate finishing, in paper, is priced at $24.00 a ton, and common material, similarly packed, $19.50 a ton. Finishing lime, in standard 300-pound barrel, is $4.50 a barrel, delivered, and common lime, same size container, $3.75.

Brownstone quarries in the vicinity of Portland, Conn., are resuming operations after a suspension of from three to four years, and more, and the outlook for the industry is encouraging. Among the companies which have recently reopened their plants, is the Brainard, Shalor & Hall Co. The quarries are among the best known in this country and have been on the active producing list for over 200 years. Employment will be given to about 75 men for initial work, and it is expected to increase this quota as soon as conditions warrant.

The Independent Sand & Gravel Co., Somerville, Mass., has been organized under state laws with a capital of $10,000, to operate sand and gravel

properties in this vicinity. Daniel J. McLean, 6 Thurston Street, Somerville, is president and treasurer.

The Burlington Sand & Gravel Co., Boston, Mass., has filed notice of organization to operate a sand, gravel and crushed stone business. The company is headed by W. Herbert Griffith and James A. Stretch, 7 Water Street, Boston.

The Johnson Marble Co., 62 First Street, East Cambridge, Mass., will commence work at once on the rebuilding of its plant, to include a number of extensions and improvements. About $30,000 will be expended.

The Knickerbocker Slate Corporation, 153 East Thirty-eighth Street, New York, N. Y., will make extensive improvements in its plant. The four-story building has been eased for a term of years and will be used in entirety by the company. It is proposed to increase the capacity to include the fabrication and manufacture of slate materials of all kinds. E. J. Johnson is president.

The Ralph Gypsum Co., LeRoy, N. Y., has been reorganized and a new Board of Directors elected. The company is operating local properties with acreage including lands at Byron and Stafford, in this same district. Extensive operations are planned, and it is proposed to develop a heavy output.

The property of the Ace Slate & Tile Works, 607 East Fifteenth Street, New York, N. Y., has been acquired by new interests, at a public sale authorized by Israel Aksebrod, Trustee in Bankruptcy, for the Ace company. The new owners are said to be arranging to operate the plant at an early date.

The Gypsolite Co., Buffalo, N. Y., lately organized with a capital of $1,000,000, is perfecting plans for the construction and operation of a new plant at Batavia, N. Y., for the manufacture of gypsum products. The structure will be one-story, equipped for grinding, crushing, screening, etc., and is estimated to cost in excess of $80,000, including machinery. J. F. H. Hagerty, 66 Bedford Avenue, Buffalo, heads the company.

The Canada Crushed Stone Co., Dundas, Ont., is reported to be planning for the early rebuilding of the portion of its plant recently destroyed by fire, with loss estimated at close to $350,000, including machinery and buildings. A new loading viaduct was completely demolished.

The Alexander Pelli & Co., New York, N. Y., operating a marble and stone works at 509 East 120th Street, will soon commence the construction of a new plant on Queens Boulevard, Elmhurst, L. I. It will be one-story, 105x155 feet, with equipment for grinding, polishing, etc., as well as complete hoisting and conveying machinery between the different departments. It will cost about $75,000.

Sand and gravel producers in the Raritan River section of New Jersey, as well as in other parts of the state, are increasing production at their properties and large shipments are being made. There is a particularly keen demand for material for highway construction and heavy distribution is being made for this account. Building operations, as well, are absorbing sizable quantities of stock. Common labor is finding ready employment at the different pits, receiving from 35 to 40 cents an hour. John I. Bowes, one of the well known producers at Menantico, near Vineland, N. J., president of the Menantico Sand & Gravel Co., died April 25, at the age of 45 years. He had many friends in the industry in this section.

The Weaver Stone Crushing Co., Center Valley, Pa., is maintaining active operations at its plant, and the company is said to have secured a number of orders for road construction materials in the state. Quantity shipments are leaving the plant.

The Hillside Quarry Co., Hillside, Pa., has been formed under state laws, to operate stone quarries in this section. E. L. Benson, Hillside, has been elected treasurer. The company is capitalized at $25,000.

Slate plants in the vicinity of Slatington, Pa., are engaging under heavy production, as mentioned in the last issue of PIT AND QUARRY, and since this time, other producers have announced intentions of early resumption of activity. These include the Blumont Slate Co. The first noted has installed pumping machinery at its plant and is removing water from submerged property and will soon take on a good sized working force. The Providence company, with works at Berlinsville, has been inactive for a number of years, and is now making alterations and improvements with view to immediate production.

The Danville Iron & Steel Co., Danville, Pa., has recently completed the construction of the largest stone crusher ever made at the plant, for use at a crushing works at Sandusky, Ohio.

Kentucky Sun Shining

Building Operations Demanding Much in Way of Materials

By Our Louisville Correspondent

It is fairly busy times all around in Kentucky and the state as a whole is peculiarly fortunate right now. The sun of prosperity is shining brightly in the bluegrass state at this writng, partly because of the recent distribution of nine million dollars more or less of tobacco money in the bluegrass section as a payment on pooled tobacco, but largely because the coal mines of the state are unusually busy as a result of the coal strike throughout the country. In fact the coal mines in the state are so busy and demanding so much in the way of cars and railway service that it is hampering other shipping somewhat, especially at such terminals as Evansville, Louisville and Cincinnati. It is bringing money into the state, however, and adding to the general prosperity, all of which is contributing some to the building boom and to the crushed stone and gravel business.

The main features of the month are local building operations which have reached the boom stage, and in street, sewer and road building which is going along at a splendid gait.

The regular commercial business of the crushed and ground limestone is still suffering from high freights but there is lots of local quarry work in connection with road contracts and there seems to be a fair amount of railway ballast work throughout the state and some of the large crushing plants are busy on this.

Local contracts are to be let for two miles of new streets, and contracts are also being awarded for $100,000 worth of sewer construction.

One sewer contract for $25,000 has been let to Charles F. Smith & Sons, of Dayton, Ohio, and other contracts for sewers and streets are to be let during the month.

Meantime private enterprise is busy and a goodly amount of building is going on furnishing better business with the sand and gravel people.

The Ohio River Sand Co. has taken some good contracts lately and is entering into what looks like a busy season all around.

It seems to be pretty much the same story with the other sand and gravel concerns here, the E. I. Slider Co., and the Nugent Sand Co. It looks like an unusual volume of business locally in street and sewer work and in general construction, and also like there is to be a goodly volume of carlot business to dealers and to road contracts out in the state.

An interesting feature of the R. B. Tyler Co. offices and display room on 4th avenue this month is a new model house in miniature representation of brick construction with a Spanish tile roof. It is in keeping with the model house exploitation which is fairly wide spread now but it stands out conspiciously because it represents brick and tile and concrete construction instead of wood.

The development of the busy season and the growing prosperity of the state is reflected in the organizing of several new concerns throughout the state lately among them being the following reported as filling articles of incorporation with the Secretary of the state at Frankfort:

River-Shanks Construction Company, Louisville, $50,000; R. H. Rivers, M. C. Shanks and R. L. Page.

Kenwick Construction and Supply Company, Lexington, $10,000; George F. Sutton, Thomas D. Murray and Peyton A. Jordan.

Kentucky Shale Company, Barbourville, $35,000; James D. Black, F. W. Golden and H. B. Clark.

The Kentucky Sand Company, Newport, $60,000; Fred E. Hall, Douglas P. Hall and C. S. Hall.

Typo Sand & Gravel Company, Typo, $5,000; H. H. Braden, G. S. Greear and J. D. Kries.

Two local projects of importance are, in the organizing of the Inland Waterways Co., a new million dollar corporation to operate boats and barges on the river, and which plans of construction of important river terminal here. This concern takes over the boats and barges formerly operated by the Frankfort Elevator & Coal Co. and is to build a fleet of steel barges to operate between Louisville and Pittsburg.

The other is the creating of a subsidiary company which has made application for permission to erect a plant and harness the water power possibilities of the Ohio Falls at Louisville.

Movies Shown in Court

Process of Cement Manufacture Introduced at New York Hearing

Motion pictures were shown at the trial in New York of cement manufacturers indicted on a charge of combining in restraint of trade, to illustrate the steps in manufacturing cement from the quarrying to the finished product. H. Struckerman, of the International Portland Cement Company, gave a preliminary description of the processes.

Statistical exhibits read into the record for the defense showed that the nineteen defendant companies aggregated an annual output of more than 27,000,000 barrels of cement. The total investment represented was placed at $150,000,000 and the average net return for the nine years between 1913 and 1921 was less than 5 per cent. The cost of coal used in the manufacture of cement was the main expense, it was shown, as it requires 200 pounds of coal to produce a single barrel of cement.

The second count of the indictment was dismissed, in which the defendants charged with having entered into a conspiracy with the Protective Association to restrain trade by endeavoring to curtail the production of Portland cement.

Judge Knox declared that the Government had failed to specify in the indictment any allegation that denoted the defendants had violated the Sherman law by attempting to curtail the output of cement. Evidence introduced by the Government during the trial in connection with the second count of the indictment the court held to be insufficient to submit to the jury.

Gen. George W. Goethals, the builder of the Panama Canal, testified for the defense.

Testifying as an expert, Gen. Goethals described the development of the cement industry, which he had been connected with both as a Government expert in the nineties and later as a private individual.

"During the construction of the Panama Canal," said the General, "five million barrels of cement were used and we received from ten to twenty bids yearly from different concerns wishing to supply this cement. The prices quoted varied as much as 40 to 50 cents a barrel."

Questioned by Henry L. Stimson for the defendants, the General gave considerable further data and opinions regarding the industry. He said that a most substantial improvement in the grades and quality of cement had been made owing to standardization by the Government and engineering societies. All this had resulted in its more extensive and advantageous use.

"The cement now being used," he said, "has resulted in greater economy and greater safety."

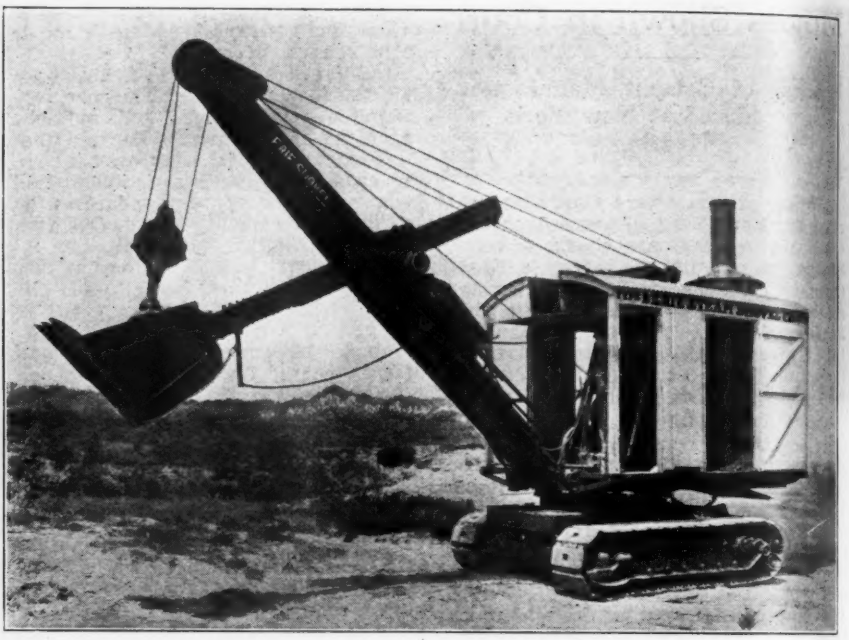
Edward N. Hurley, former chairman of the Federal Trade Commission and later of the War Trade Board and the Shipping Board, was also called as a witness for the defense.

Mr. Hurley testified he investigated the cement industry, among others, when he was appointed by President Wilson in 1915 to inquire into general industrial conditions. At that time, he said, it was found that the business men of the country were carrying on unfair competition, largely because of their ignorance of actual costs. Accordingly the Federal Trade Commission laid stress upon obtaining and disseminating information regarding these matters, and among those who received this information was the cement trade. He also said that the Federal Trade Commission actually had encouraged the formation of trade associations, and in this respect the witness included the fact that the formation of the Cement Makers Protective Association had been encouraged.

In fact, Mr. Hurley said he had recommended that the trade associations adopt uniform cost accounting methods. He wrote about this attitude to the cement association in 1916.

The Weber Sand & Gravel Co., Salt Lake, Utah, has recently been incorporated with a capital of $5,000. C. N. Strike of Salt Lake is president and director, L. N. Strike of Ogden, vice-president and director and W. A. Brown of Ogden, secretary. The company has taken over the property of the J. B. Moore pit.

The Queen Anne Sand & Gravel Co., Seattle, Wash., has been organized with a capital of $20,000. Organizers: H. E. L. Thomas and S. H. Crookes.



Erie Steam Shovel Company Announces New Design

The re-designing of the new 20-ton "B" Erie shovel, the 1922-23 machine, has just been completed by the Erie Steam Shovel Company and they have begun to ship the new machine in place of the 1921 "B" Erie.

On the new 1922-23 model the object has been to provide extra protection against accident and abuse at every point—and to accomplish this some parts have been increased in size, even though already heavy for the service intended.

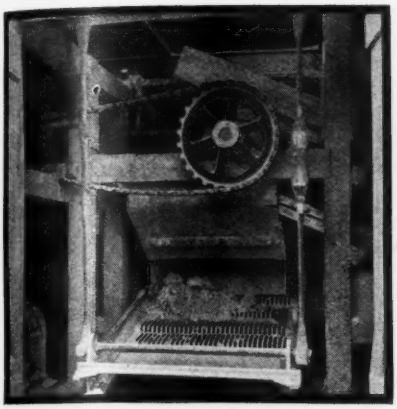
The new machine has more power than previously found oh steam shovels in the 20-ton class—hoisting power enough to handle a full size ¾-yd. dipper even with a 21 ft. boom and 18 ft. 6 in. dipper handle.

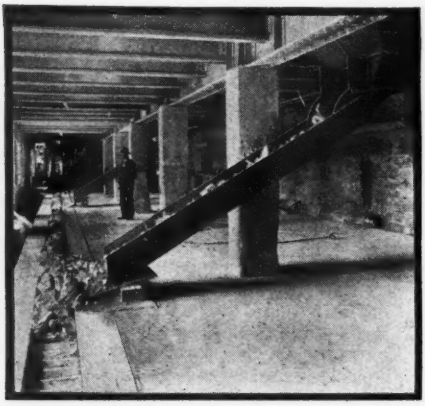
Improvements in the trucks are many, and include a reinforced truck frame of stronger design than ever before used; heavier propelling shaft, with ample strength to stand the severe abuse that this shaft sometimes receives on a caterpillar type machine in cold weather when the treads have been "frozen in." Split collars are provided on the rear axle, for throwing the propelling gears on a traction wheel shovel out of mesh in a few minutes' time, so that the shovel can be towed behind a motor truck at a speed of 3 to 4 miles per hour.

The traction wheel mounting of the new 1922-23 Erie is interchangeable either wtih car wheels or with the Erie's lubricated caterpillar type mounting, introduced last season—which has all link connections and roller bearings automatically lubricated from internal reservoirs.

The turntable casting has been reinforced with flanged webs for greater strength, and—another entirely new feature—has guards to keep water off the cone-roller path so that this path remains absolutely dry and the rollers do not slide. The cone-rollers themselves are of a harder and tougher steel than has ever been used for this purpose.

New features of the operating mechanism include a new boom hoist design which provides instant accessibility for the hoisting engine crank shaft bearing, the worm gears of the boom hoist running in oil. The hoisting engine crank shaft is heavier, making the engines run smoother and for a longer time without adjustment. There is also a new and better 3-feed





LIME PLANT OPERATORS

WHEN the stripping is done, the quarry is cleaned up, the kilns are in good order and the fuel ratio is mounting up to somewhere near where it should be—

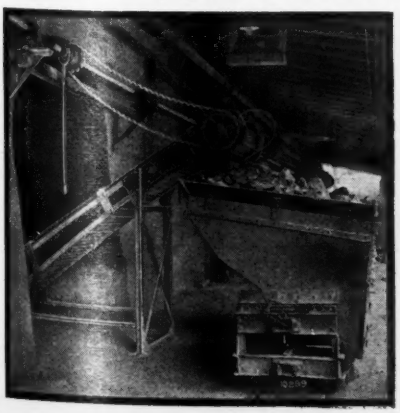
WHEN the men are giving a full day's work, the hydrator is turning out a good product and the railroads are delivering plenty of cars—

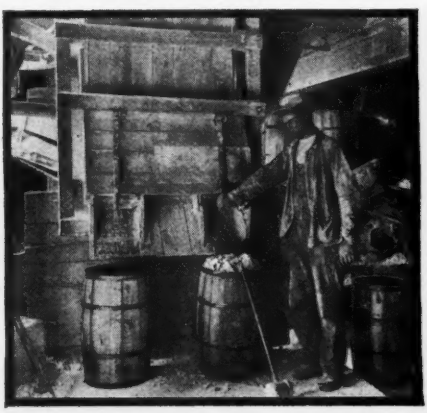
WHEN all these things have come to pass and you congratulate yourself as the operator of an economical plant—

THEN sit down and figure out how much your hand labor costs, in getting lime from the kilns through its various handlings to the box car—and write to us.

LINK-BELT COMPANY

Philadelphia—Hunting Park Ave. & P. & R. Ry. Chicago—300 W. Pershing Rd. (39th Street)





oil pump for positive lubrication of the hoisting, swinging, and crowding engines, heavy brass piping being used.

Another of the finest improvements is the new design of the main swinging shaft bearing, by means of which the bushings can be easily renewed in a few moments, by the insertion of interchangeable bushings of a special bronze. Smoother operation at high speed has been assured by machine-cutting all gears on the hoisting, swinging and crowding trains—even the bevel gear and pinion at the beginning of the swinging train being machine-cut instead of cast.

Improvements have been made in the boom to provide still greater strength in hard digging, the supporting lugs being placed outside of the boom, so as to compact instead of spread the boom members when the boom is subjected to twisting strains. The heavy steel shipper-shaft boxes on high lift machines are cast together, eliminating all chance of the boom "spreading" even after years of service.

Another entirely new feature is the automatic tripping device—a time-saving feature which makes the operator's work much easier and adds many a day to the working season. A drum turns with the shipper-shaft and kepes the trip rope taut, automatically winding and unwinding the trip rope as the dipper handle is moved in or out. There is no time lost overhauling rope in order to dump the dipper—the drum takes up all of the slack.

Many improvements have also been made at the power-producing end of the new machine.

In announcing the new design, the Erie Steam Shovel Company has also called attention to the fact that higher standards of workmanship and construction are being maintained than have been possible at any time since 1916, as better materials can be secured than were available for any manufacturer under war time conditions.

In the May issue of PIT and QUARRY it was stated, by mistake, that the Knoxville Sand & Lime Co., of Utica, N. Y. had filed a charter for $50,000. This should have read Knoxville, Tennessee, where this company has been reorganized and is now doing business on a large scale.

Plant Enlargement

The Bucyrus Company, South Milwaukee, Wis., have under way extensive enlargements to both its plants at South Milwaukee, Wis., and Evansville, Ind.

These changes and re-arrangements are planned to take care of the increasing volume of business and to enable them to manufacture more economically. In the South Milwaukee plant, where all the larger machinery is built, a new gray iron foundry is now under construction, 276 feet in length.

The old gray iron foundry, now the south end of the steel foundry, is being converted into a cleaning room with annealing ovens, sand blast rooms and a welding room. A large addition is also being made to the steel foundry moulding floor, and an electric furnace is being installed. Extensive improvements are also being made in the foundry storage yards.

In the plant at Evansville, Ind., which specializes in the manufacture of small revolving shovels, the machine and erecting shops are being considerably enlarged to enable the company to handle its rapidly increasing business in these machines.

Clover Follows Limestone

A thrifty growth of red clover which is attracting the notice of farmers from all parts of Pike County, is that on the farm of Louis Hustedde near Bowling Green. This remarkable stand now in the luxuriance of its second year's growth is the result of an application of ground limestone made in 1920. On the same field Mr. Hustedde left a strip without lime but with the same preparation in other respects and the same amount of clover seed. This strip today has practically no clover, being bare except for weeds, a little timothy and other grasses.

This convincing demonstration was made possible by Mr. Hustedde's enthusiastic cooperation with County Agent E. R. Keller and the Missouri College of Agriculture. Here, again, is emphasized the time-tried truth that "clover follows lime."—*Missouri Farm Bulletin.*

Ingersoll-Rand

"Little Tugger" Hoists Are

Light, compact, portable, compressed air or steam-operated hoists. They can be set up anywhere almost instantly without the use of special tools or fittings.

Weight (without rope) ..... **285 lbs.**
Dimensions ..... **21¼ in. x 16½ in. x 20⅛ in.**
Hoisting capacity (80 lbs. air pres.) ..... **1000 lbs.**
Hoisting speed (80 lbs. air pres.) ..... **85 ft. per min.**

Can be clamped to a pipe or can be bolted to a timber.

Request Bulletin No. 4333

INGERSOLL-RAND COMPANY
11 Broadway, New York

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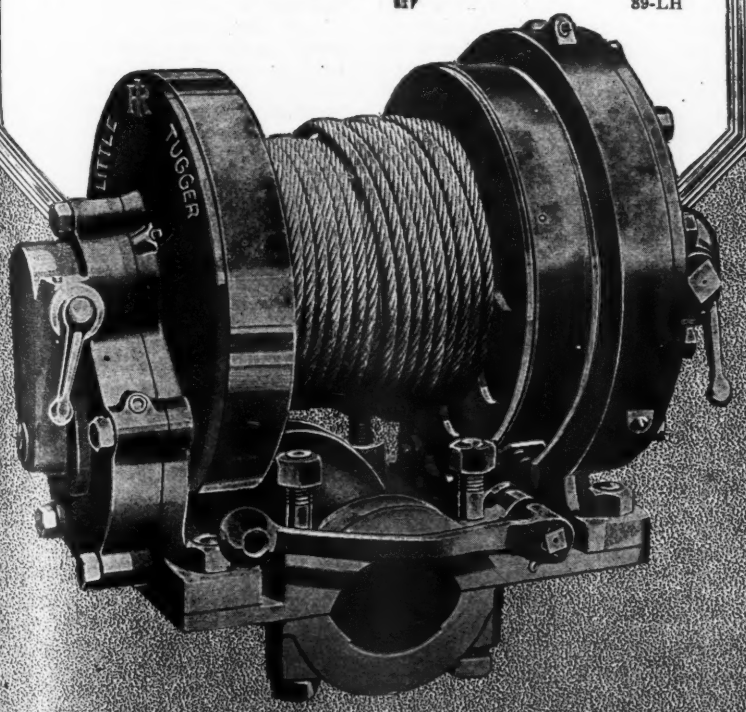

Dump Bodies and Hoists for Handling Gravel

Many sand and gravel companies have found it advisable to use fleets of motor trucks in delivering sand and gravel for various construction jobs as well as for road work. One of these companies in Chicago is operated by H. Bairstow.

The truck shown in the accompanying photograph is a 7½-ton Sterling equipped with a 35-cubic yard gravel body and No. 6 hydro hoist.

The hydro hoist permits the body to be mounted just back of the cab thus utilizing all the loading space and giving proper load distribution. The hoist itself has a tremendous lifting power. It is tested to 19-tons lifting pressure before it is sent out of the factory. This does not mean that 19 tons is its maximum lifting power at all, for it can handle any size load.

The hoist is very simple in its construction, consisting of a gear pump which forces the oil through oil ways to the bottom of the cylinder where the full pressure is applied to the bottom of the piston heads on which are fitted two piston rod heads. The pressure applied there carries the pistons up and with them the body. The dumping angles which can be secured vary with the different types of trucks. The unit shown gives a dumping angle of 45 degrees. The power take off is a standard power take off. The gears running in oil at all times.

The controls for operating the hoist can be seen just under the cushion of the heel board in the cab. It is not necessary for the driver to get out to operate any levers back of the cab.

Heil bodies are reinforced and made strong to handle extra heavy loads. The operating device is a standard Heil 100 percent manual tail gate control which secures the locking of the tail gate when the body returns to the normal or down position.

The Heil Company, Milwaukee, Wis., prepared some interesting literature covering this equipment and will be glad to send it to any pit or quarry operator.

Joins Crow Organization

Among the recent executive acquisitions to Waller Crow, Inc., engineers, counsellors in industrial operations and finance, 327 South La Salle street, Chicago, is Mr. Carleton E. Nordale, a well known mining and industrial engineer.

Mr. Nordale is a product of the University of Minnesota and the Michigan College of Mines, with several years of practical mining experience in the metal mines of Utah and Idaho. Has also occupied the position of chief chemist for a large mining enterprise besides doing considerable research work on the design and installation of flotation units in the mills. His experience in the examination of properties both in the metallic and nonmetallic line has been very wide at the time he was engaged in private engineering practice in Chicago. Among other work handled by Mr. Nordale is the design and construction of special machines for industrial purposes along the lines of grinding and pulverizing units and many material handling devices.

Mr. Nordale is a member of the American Institute of Mining and metallurgical Engineers and is well known to the industry as a whole.

The Central Sand and Gravel Company, 1706 Arcade Building, St. Louis, Missouri, has changed the name of the concern to the Southern Sand and Gravel Company.